



Planning and Assistance Division

GENERAL BASIN MAP

LOUP RIVER BASIN



DRAFT

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Location Map

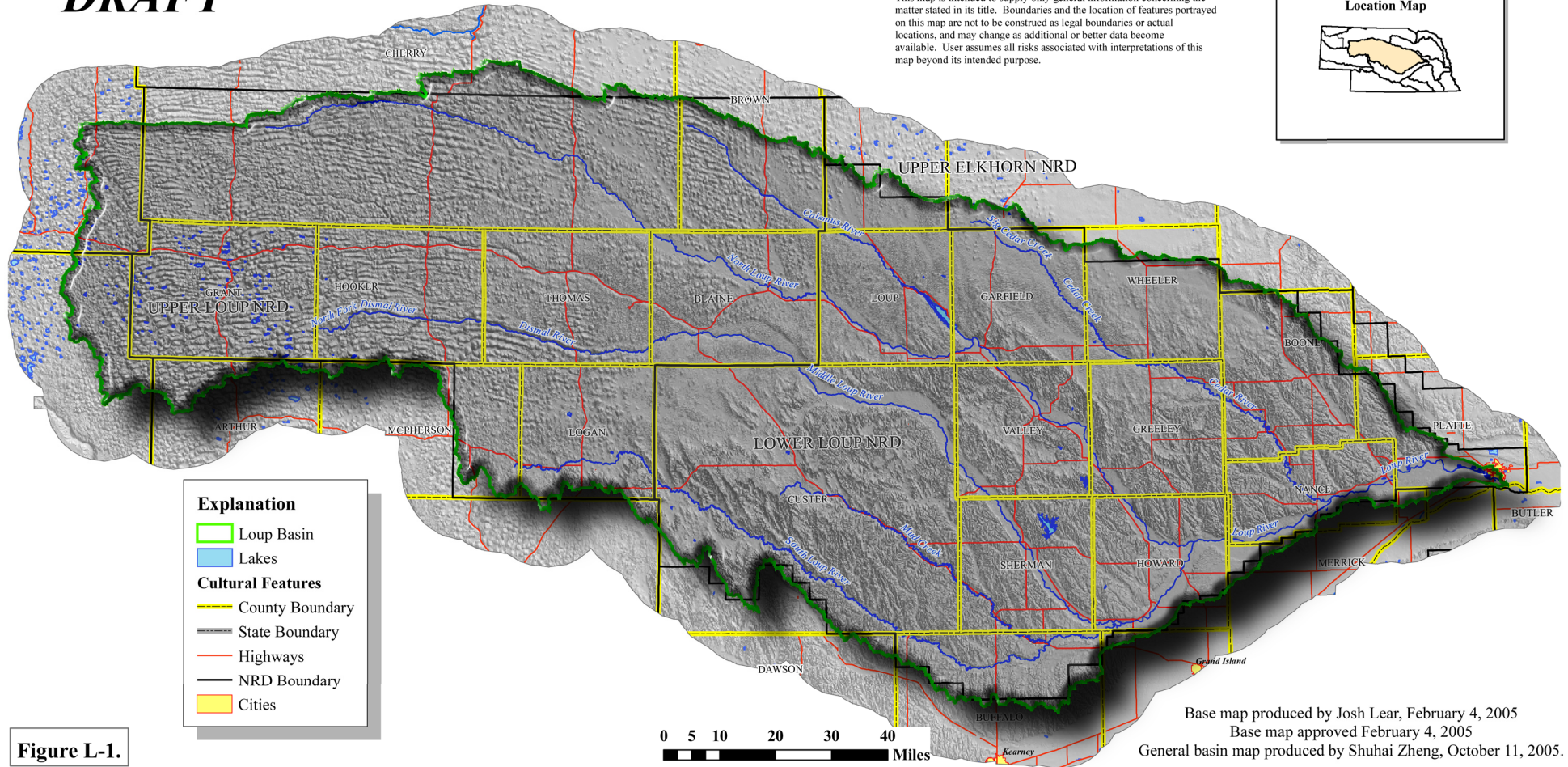


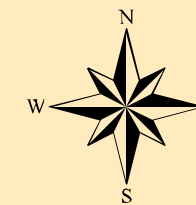
Figure L-1.



Planning and Assistance Division

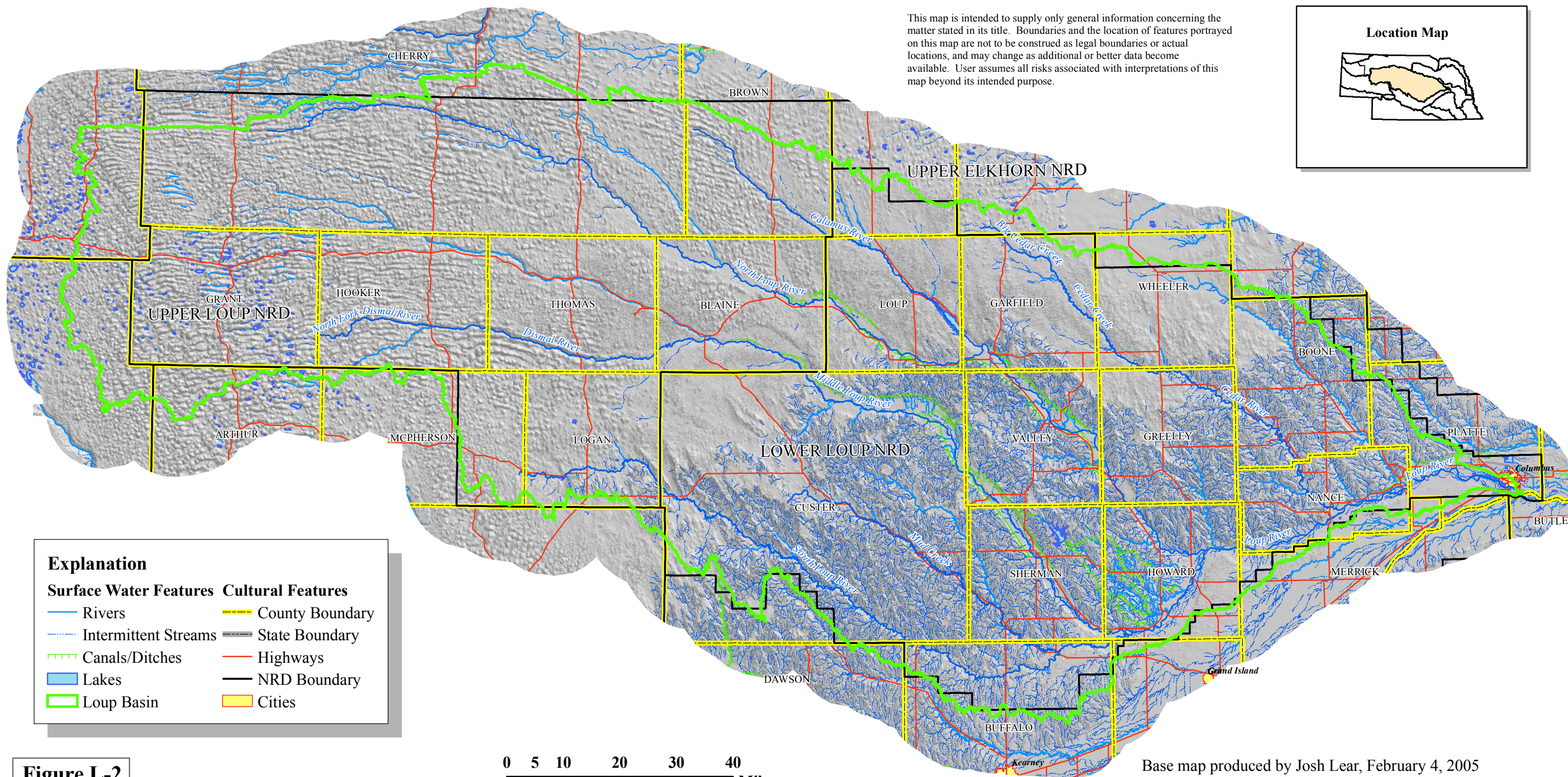
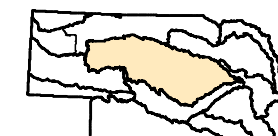
GENERAL SURFACE WATER FEATURES

LOUP RIVER BASIN



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Location Map



Explanation

Surface Water Features	Cultural Features
Rivers	County Boundary
Intermittent Streams	State Boundary
Canals/Ditches	Highways
Lakes	NRD Boundary
Loup Basin	Cities

Figure L-2.

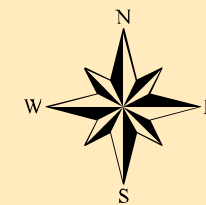
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
General surface water features map produced by Shuhai Zheng, October 11, 2005.



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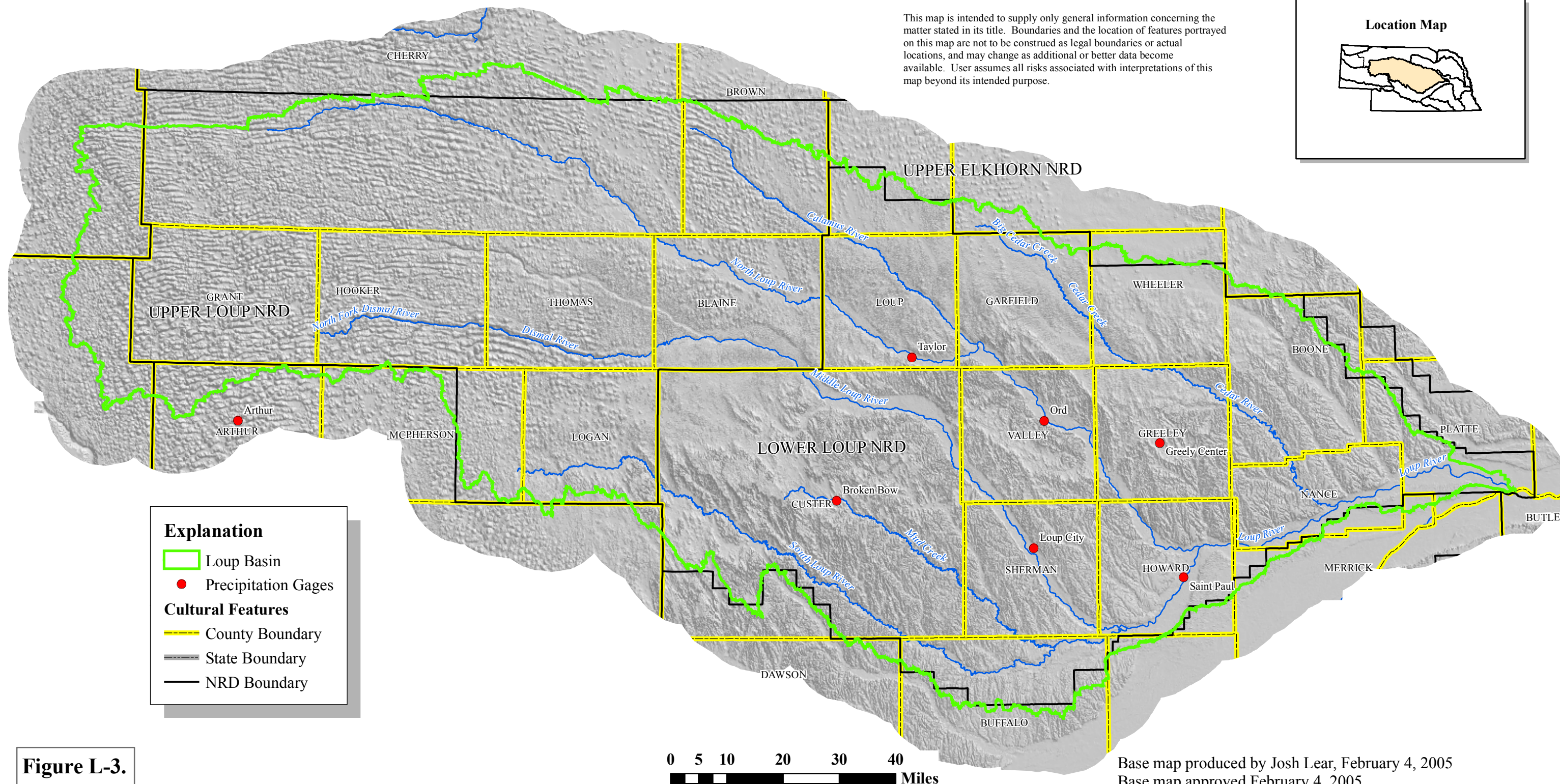
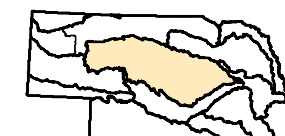
Precipitation Gages

LOUP RIVER BASIN



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Location Map



Explanation

- Loup Basin
- Precipitation Gages
- Cultural Features**
- County Boundary
- State Boundary
- NRD Boundary

Figure L-3.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Precipitation gages map produced by Jeff Shafer, October 19, 2005.

Figure L-4. Annual Precipitation at Arthur, Nebraska.

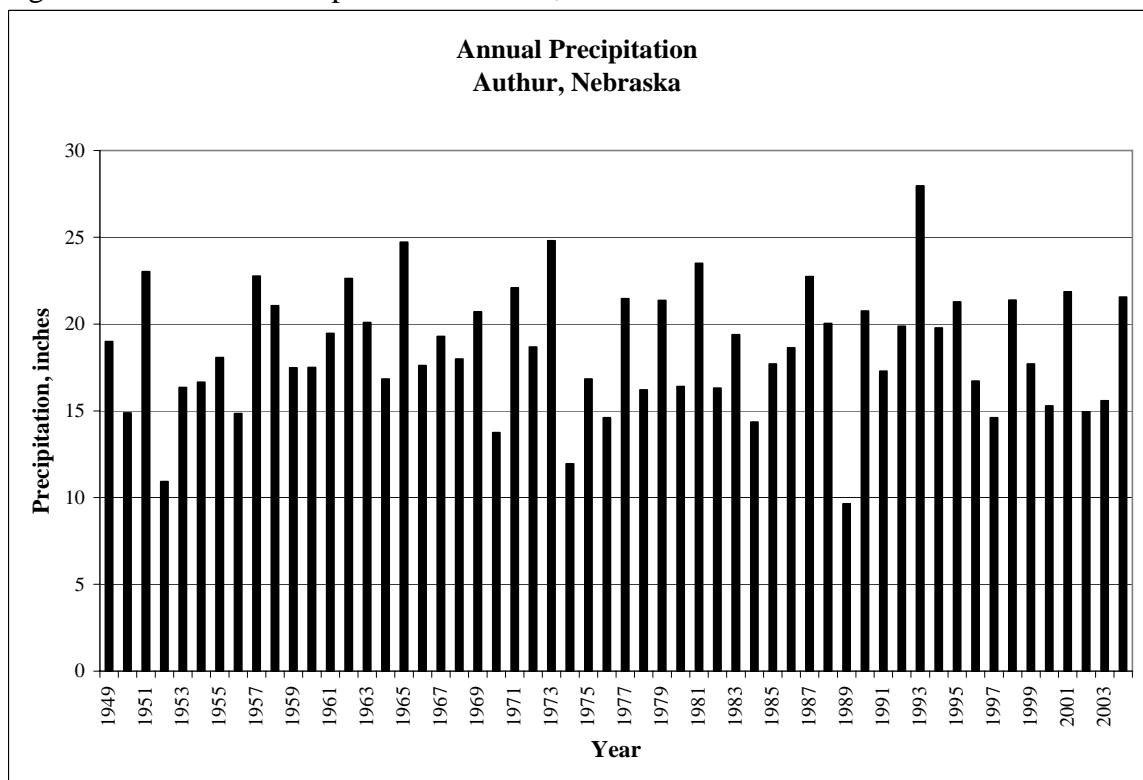


Figure L-5. Growing Season (May-September) Precipitation at Arthur, Nebraska.

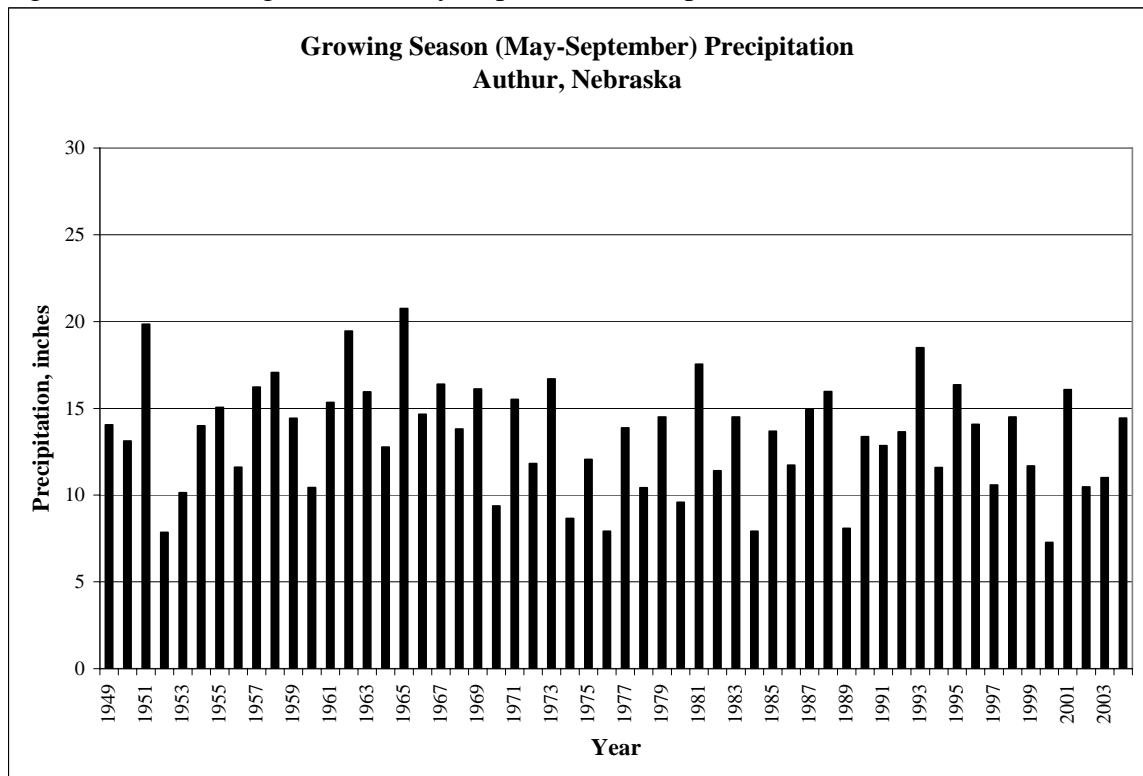


Figure L-6. Annual Precipitation at Broken Bow, Nebraska.

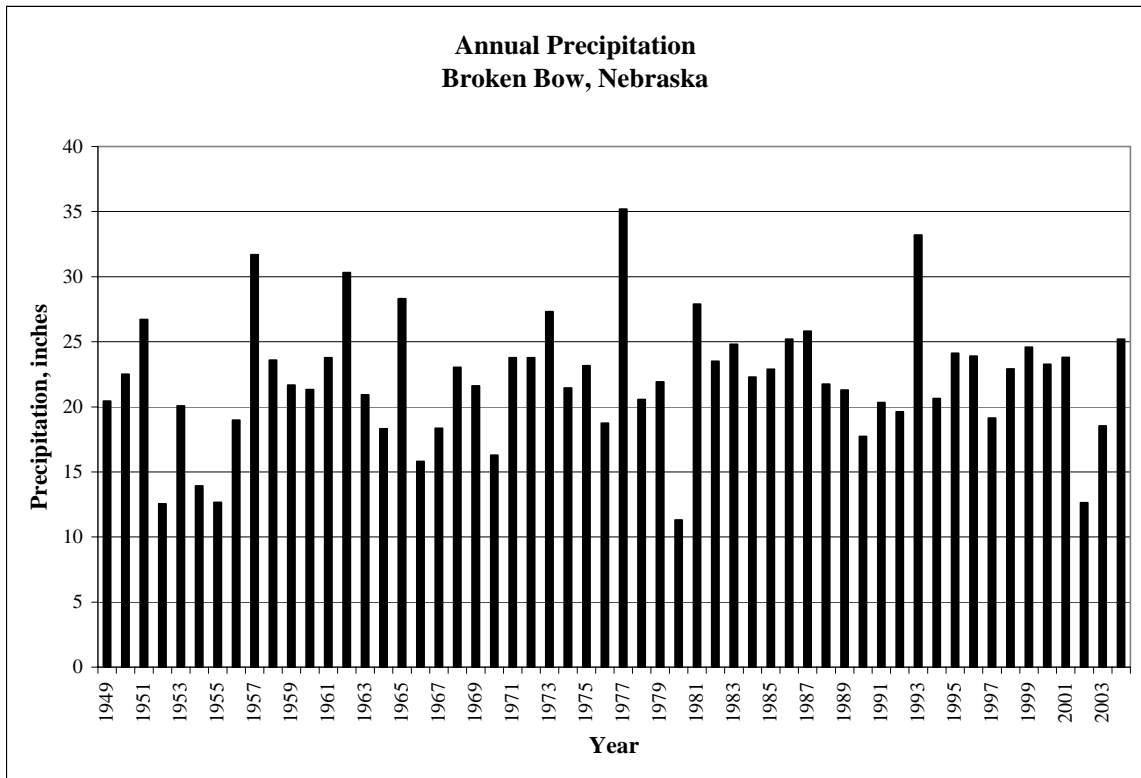


Figure L-7. Growing Season (May-September) Precipitation at Broken Bow, Nebraska.

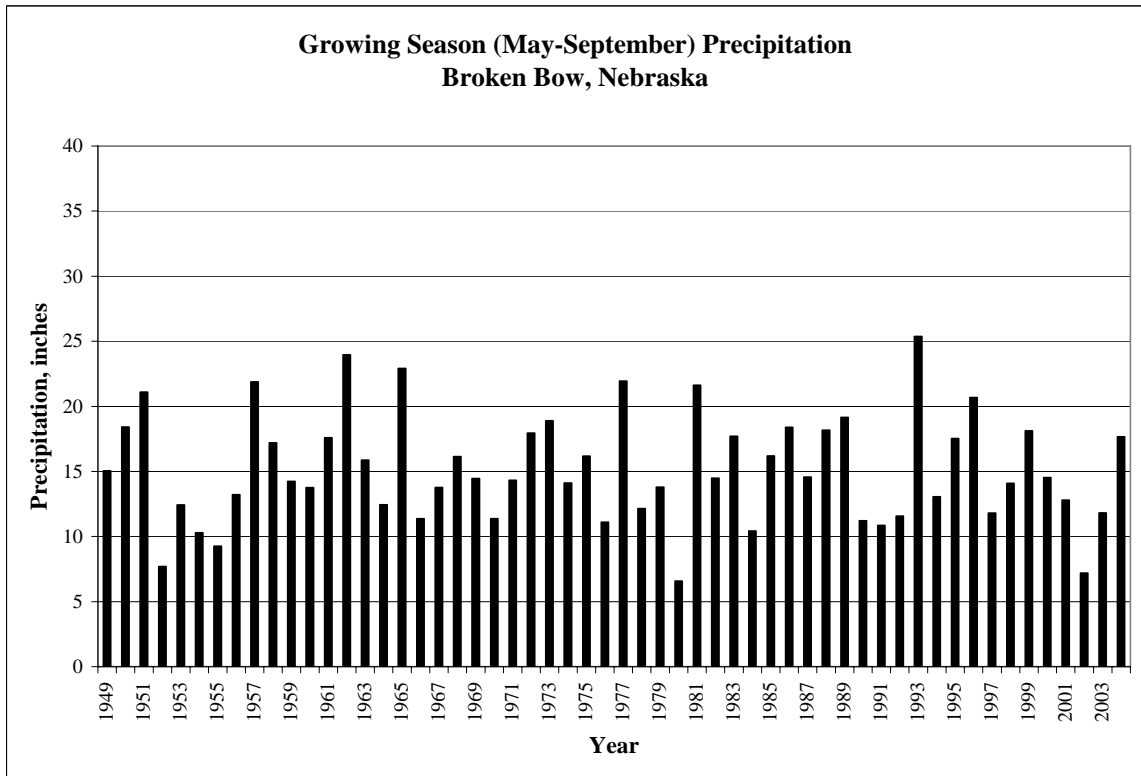


Figure L-8. Annual Precipitation at Greeley, Nebraska.

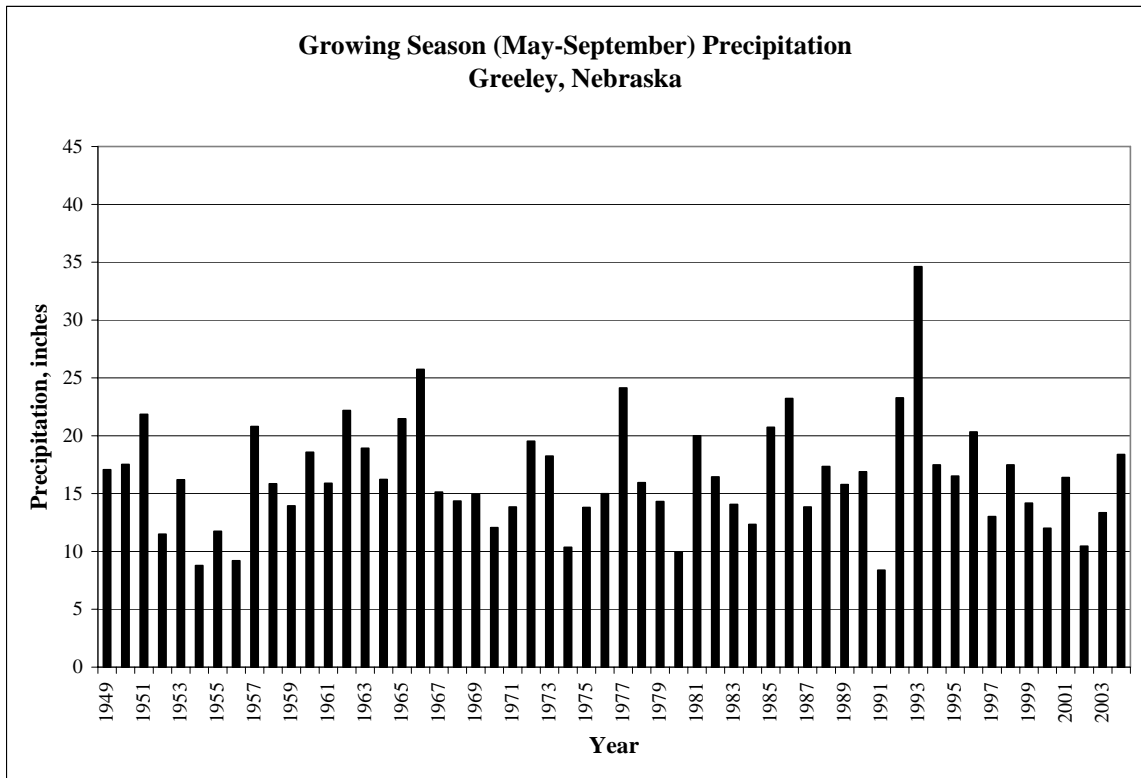


Figure L-9. Growing Season (May-September) Precipitation at Greeley, Nebraska.

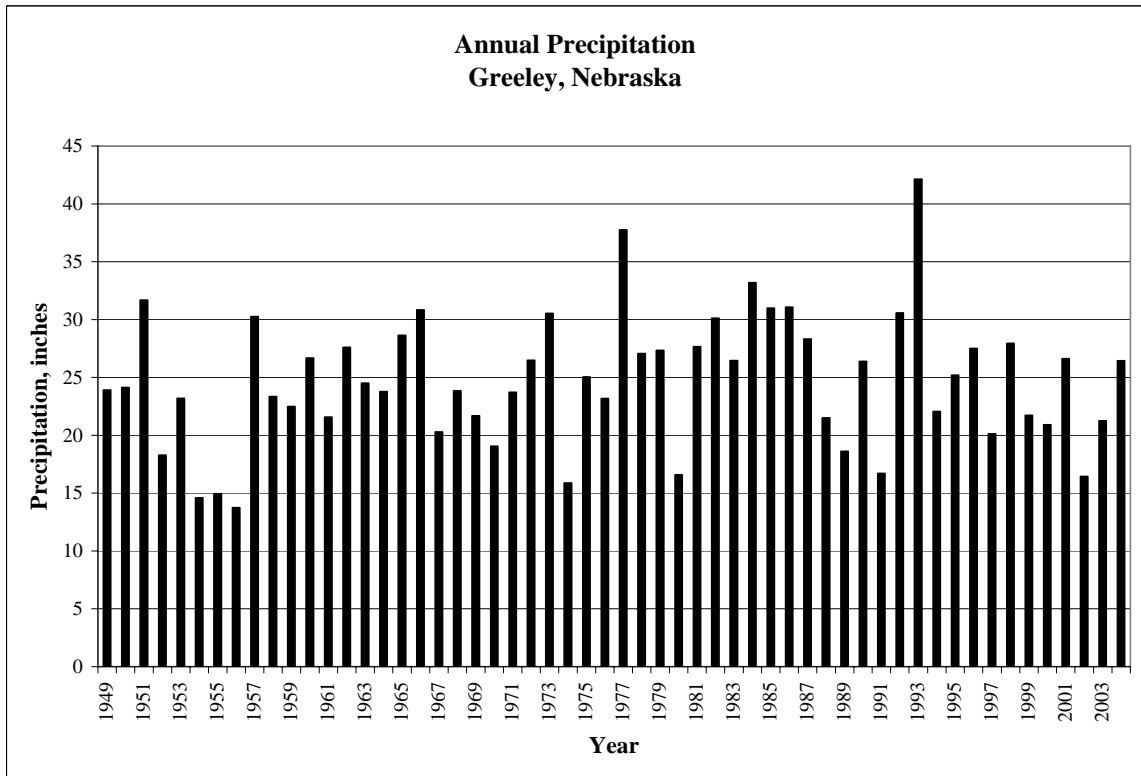


Figure L-10. Annual Precipitation at Loup City, Nebraska.

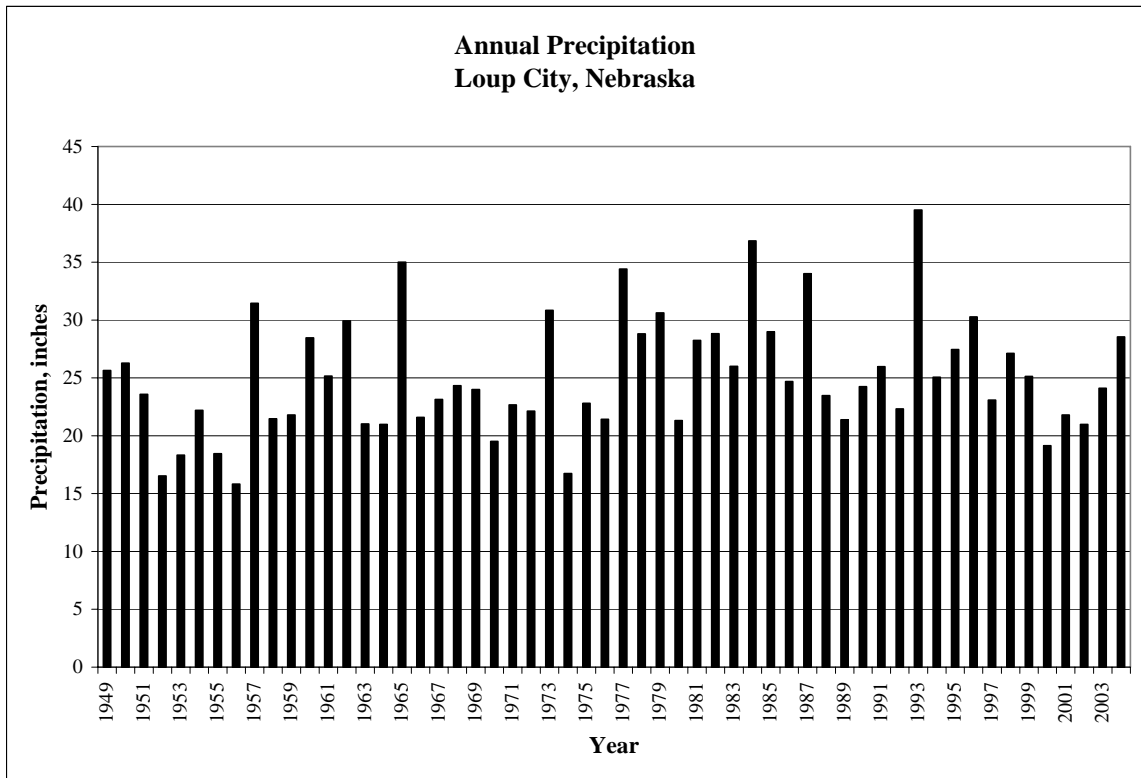


Figure L-11. Growing Season (May-September) Precipitation at Loup City, Nebraska.

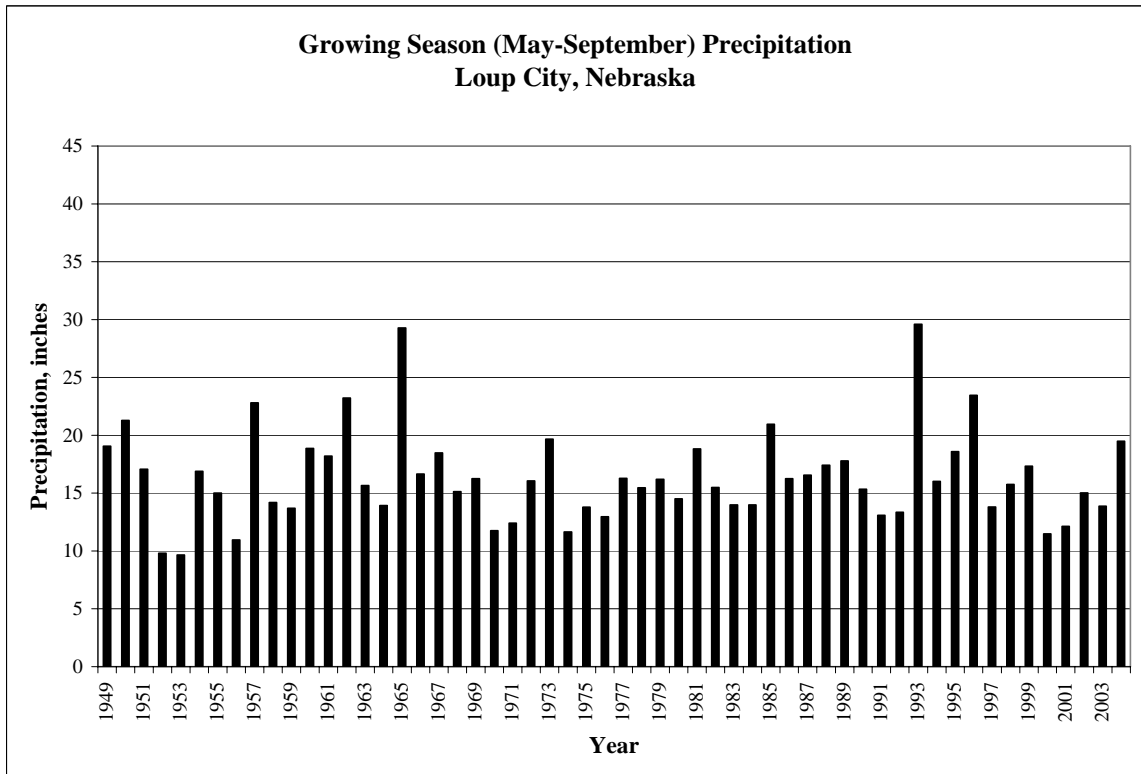


Figure L-12. Annual Precipitation at Ord, Nebraska.

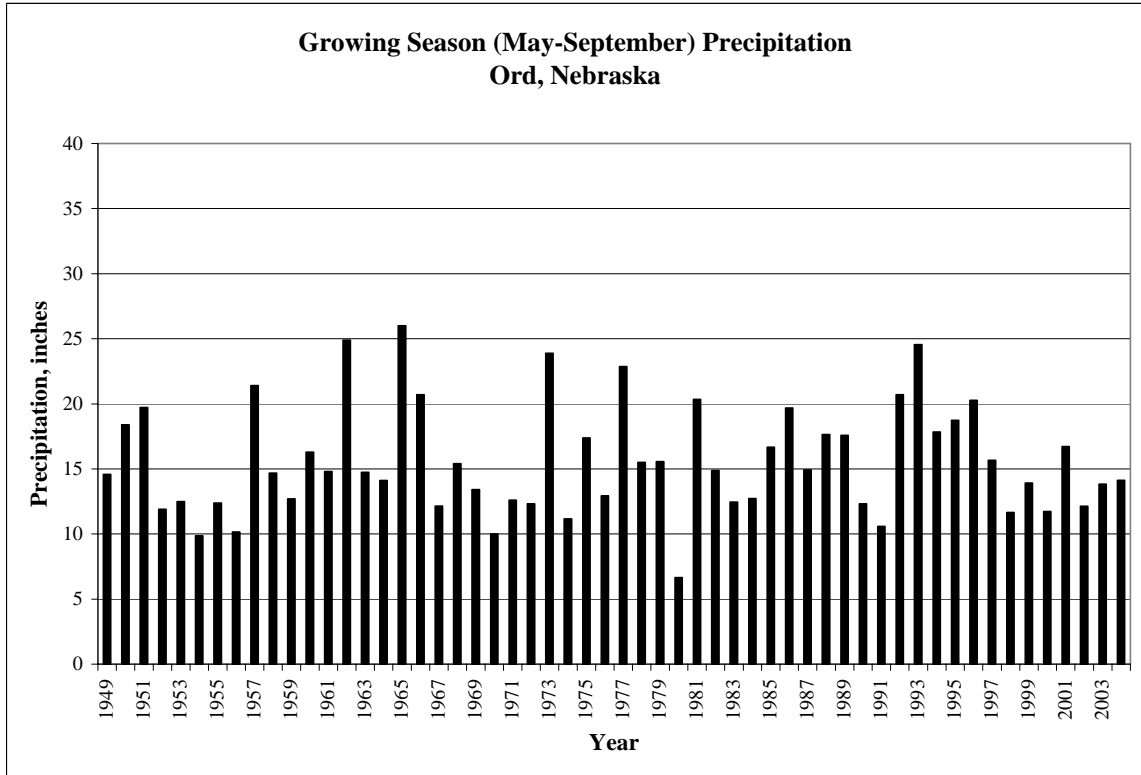


Figure L-13. Growing Season (May-September) Precipitation at Ord, Nebraska.

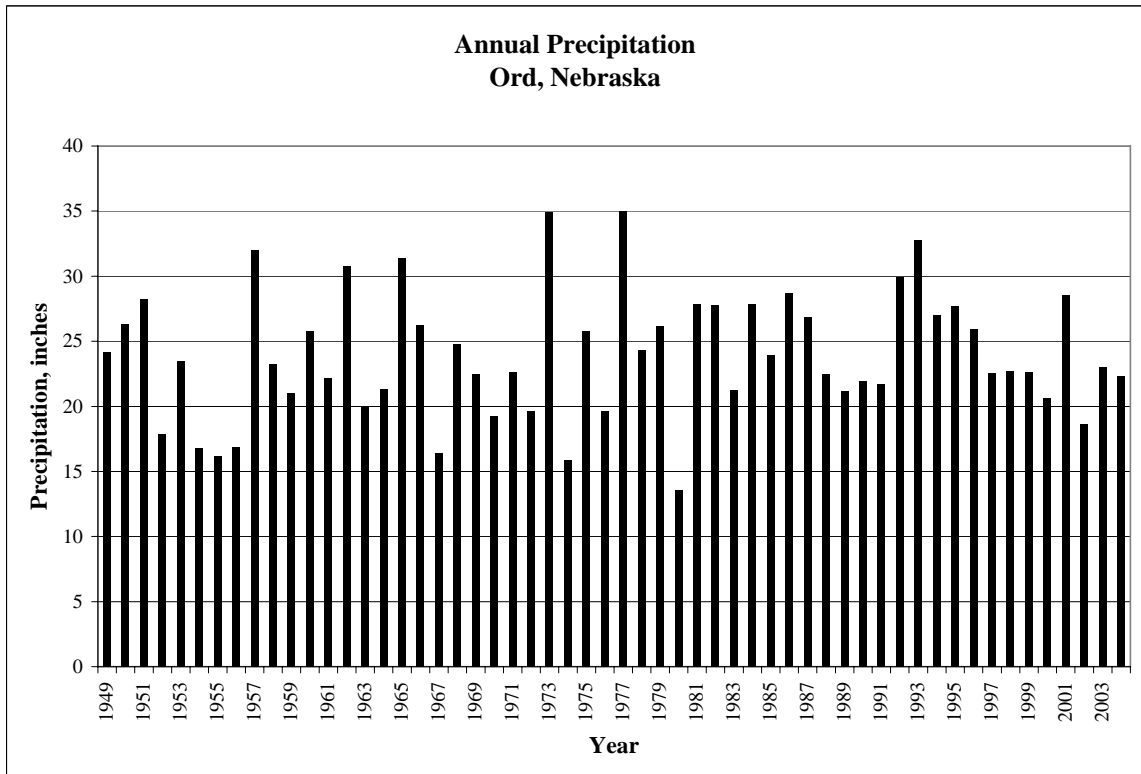


Figure L-14. Annual Precipitation at St. Paul, Nebraska.

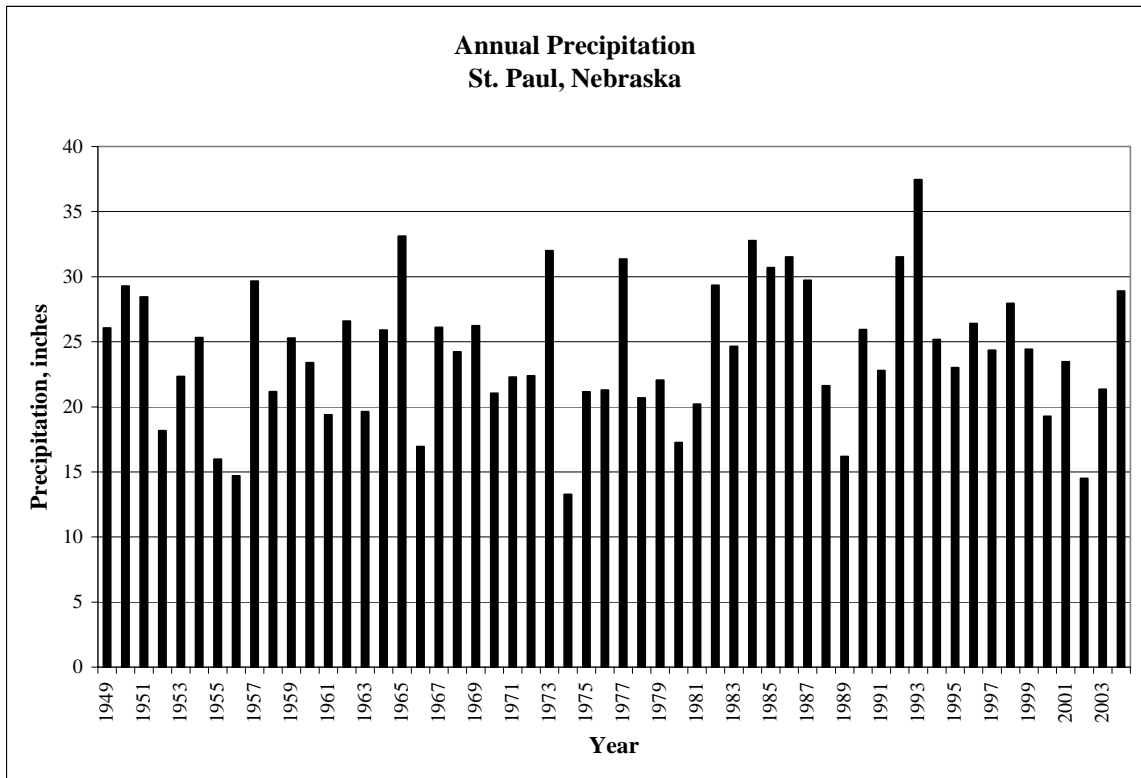


Figure L-15. Growing Season (May-September) Precipitation at St. Paul, Nebraska.

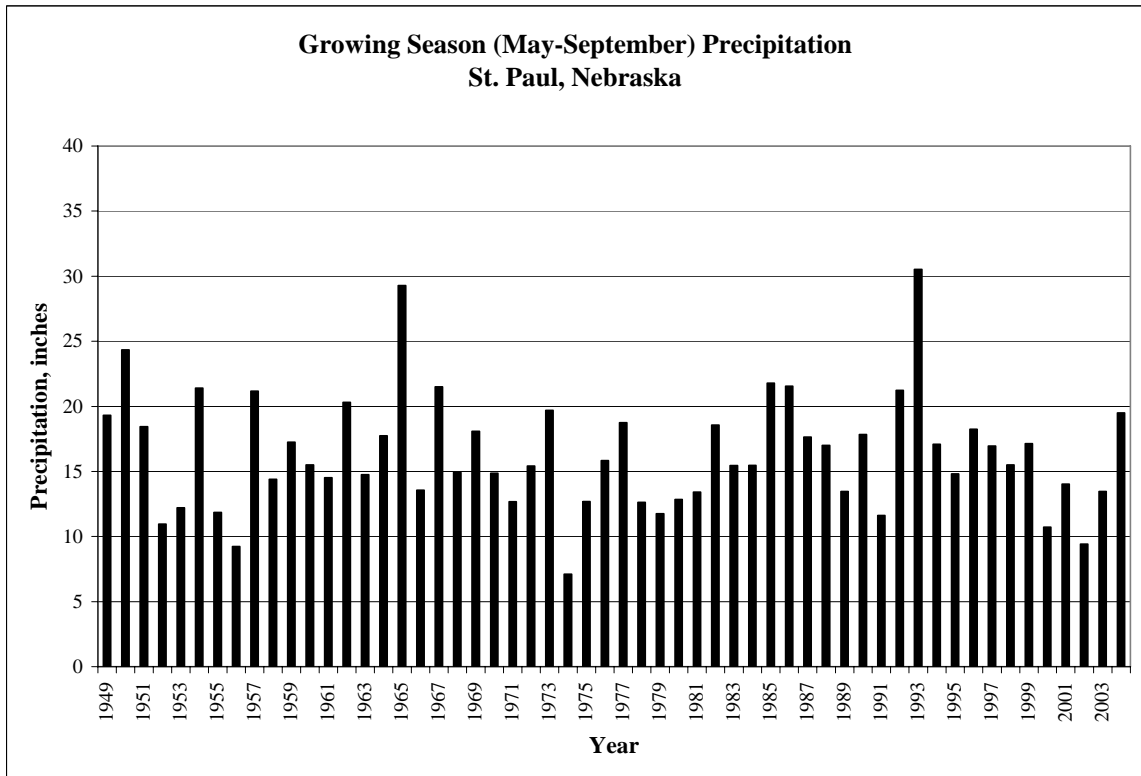


Figure L-16. Annual Precipitation at Taylor, Nebraska.

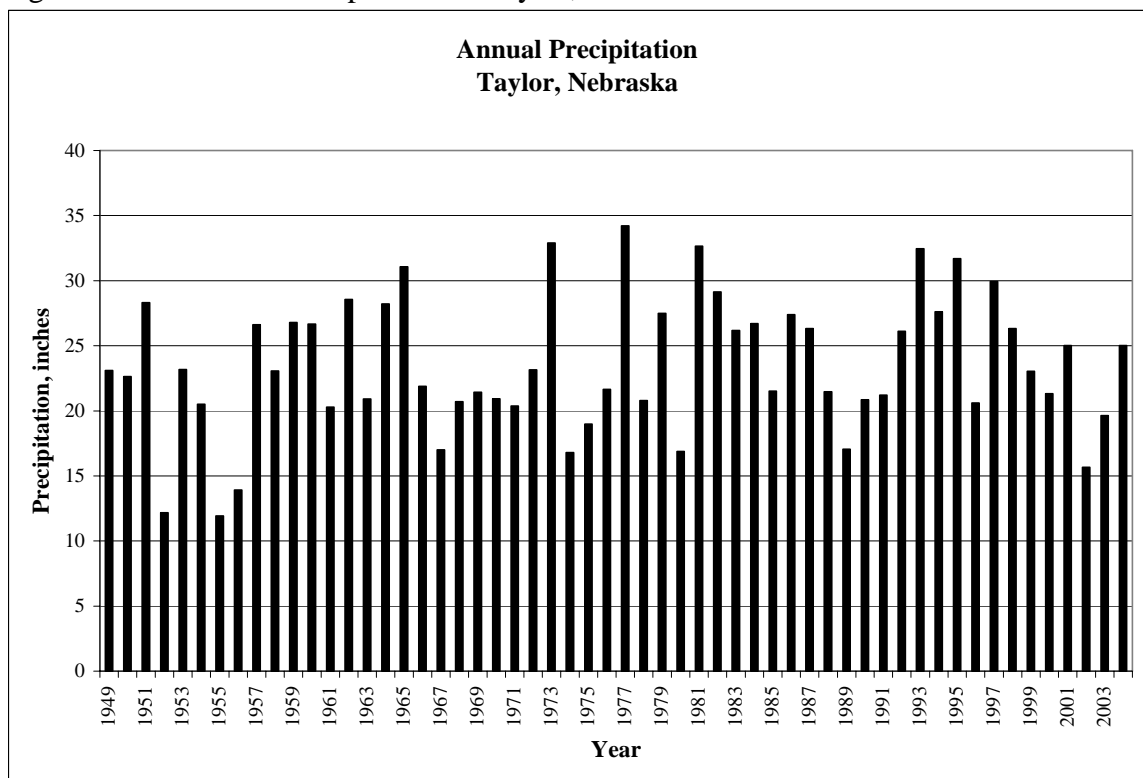


Figure L-17. Growing Season (May-September) Precipitation at Taylor, Nebraska.

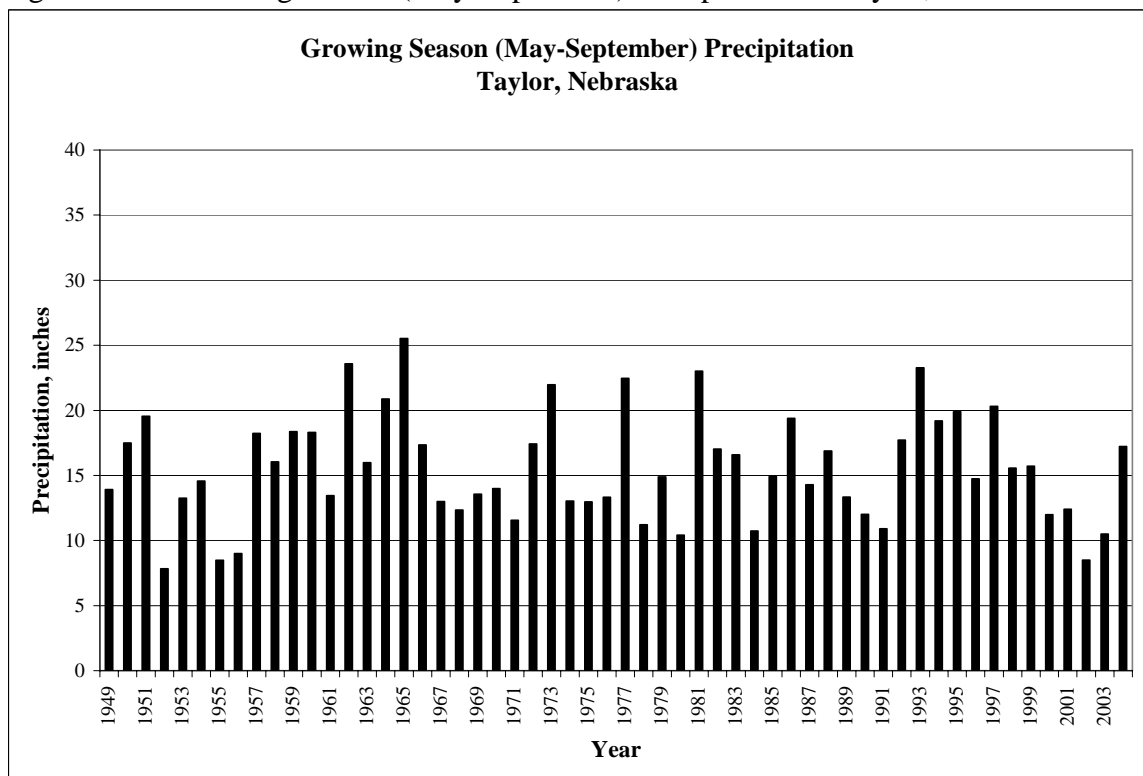


Figure L-18. Annual Precipitation at Valentine, Nebraska.

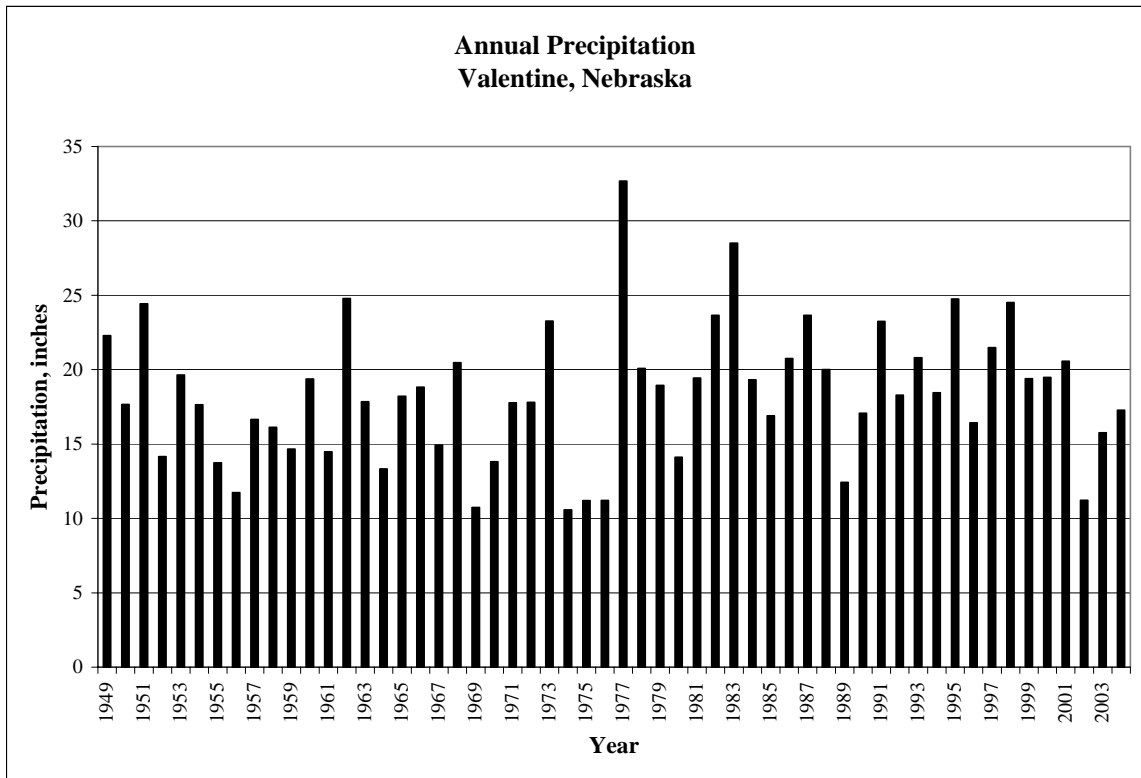


Figure L-19. Growing Season (May-September) Precipitation at Valentine, Nebraska.

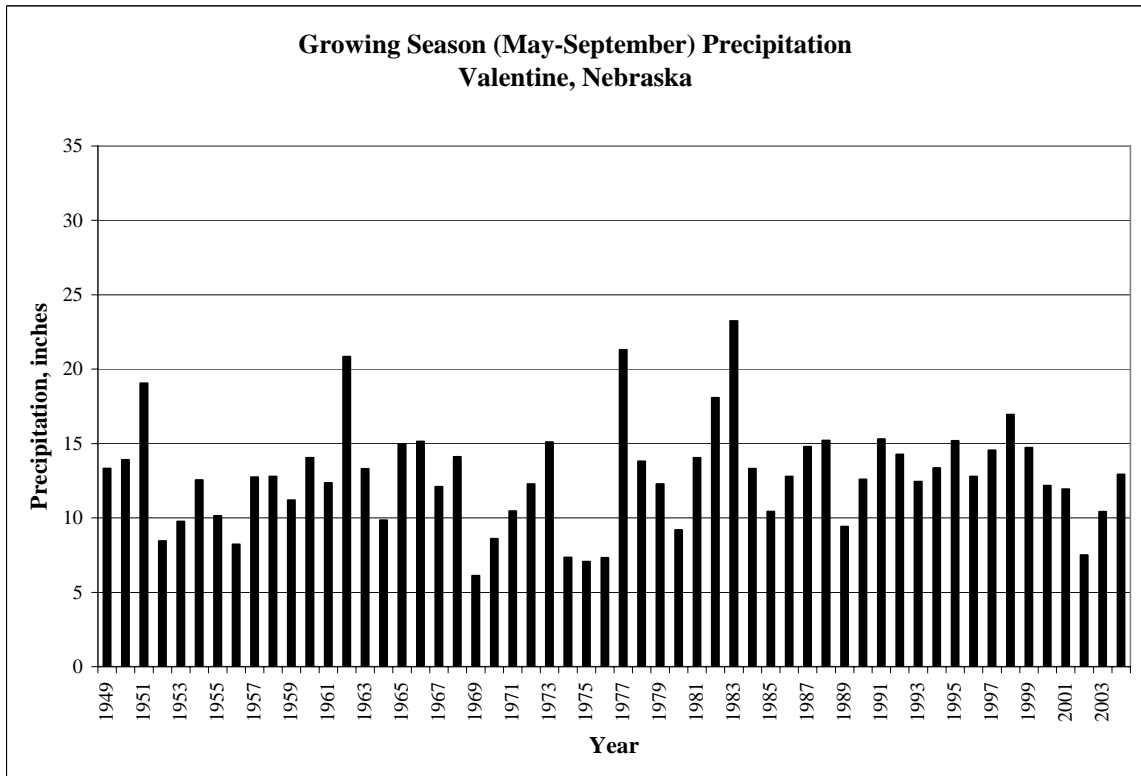


Table L-1. – Aquifers in unconsolidated surficial deposits, (modified from Brown, 1955; CSD, 1990; LLNRD, 1995; and NNRC, 1993,)

System	Hydrogeologic unit	Character and description	Maximum thickness, in feet	Hydrogeologic characteristics
Recent to Quaternary (Pleistocene)	Undifferentiated sand, gravel, silt and clay.	Eolian (dune) sand and alluvial fill. Sandy and clayey silt and sandy clay.	180	Provides moderate to high well yields.
	Todd Valley sand	Fine sand and gravel deposited as valley fill.	50	Yields water to wells in areas where it is saturated.
	Crete Formation	Sand and Gravel deposited as channel fill. Modified by local materials.	30	Yields water to wells in areas where it is saturated.
	Grand Island Formation	Sand and gravel deposited by streams.	60	Yields water to wells in areas where it is saturated.
	Holdrege Formation	Sand and gravel deposited by streams.	15	Yields abundant supplies of water to wells.
Tertiary	Plio-Pleistocene sands and gravels	Sand and gravel interbedded with silt.	>100	High capacity wells drilled to Plio-Pleistocene sands and gravels

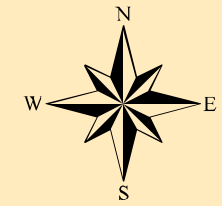
Table L-2. – Characteristics of bedrock aquifers (modified from Keech and Dreeszen, 1959, 1968; LBNRD, 1995)

System	Hydrogeologic unit	Character and description	Maximum thickness, in feet	Hydrogeologic characteristics
Tertiary	Ogallala Group	Sand, silty sand, sandy and clayey silt, sandstone, siltstone and some gravel.	600	Hydraulically connected to unconsolidated sediments, part of the primary aquifer.
Cretaceous	Niobrara Formation	Shaley chalk and limestone	400	Secondary aquifer where fractured.
	Dakota Sandstone	Sandstone and shale.	2000	Secondary aquifer. May be highly mineralized.
Ordovician and Cambrian	Undifferentiated shale, limestone, dolomite and sandstone	Shale, limestone, dolomite, some sandstone.	unknown	Cambrian and Ordovician sandstones may yield moderate to large amounts of water to wells but is too deep and highly mineralized to be of use.



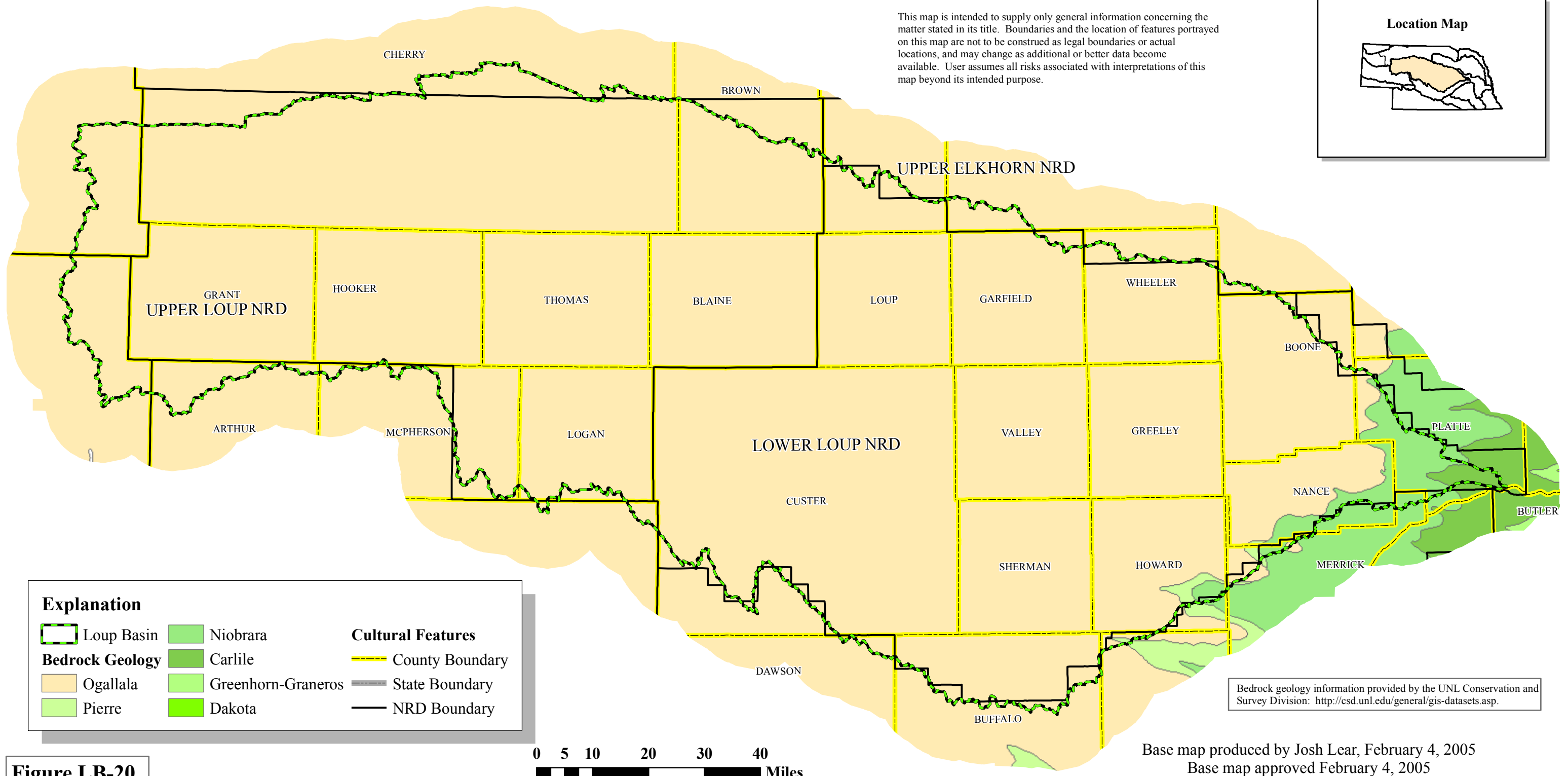
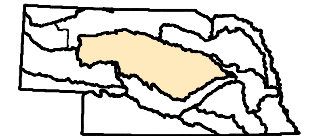
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Bedrock Geology LOUP RIVER BASIN



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Location Map



Explanation

- | | | |
|------------------------|--------------------|--------------------------|
| Loup Basin | Niobrara | Cultural Features |
| Bedrock Geology | Carlile | |
| Ogallala | Greenhorn-Graneros | |
| Pierre | Dakota | |
| | County Boundary | State Boundary |
| | | NRD Boundary |

Bedrock geology information provided by the UNL Conservation and Survey Division: <http://csd.unl.edu/general/gis-datasets.asp>.

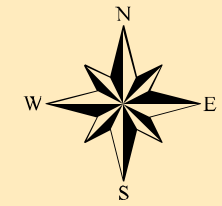
Figure LB-20.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Bedrock geology map produced by Kevin J. Schwartman, October 11, 2005



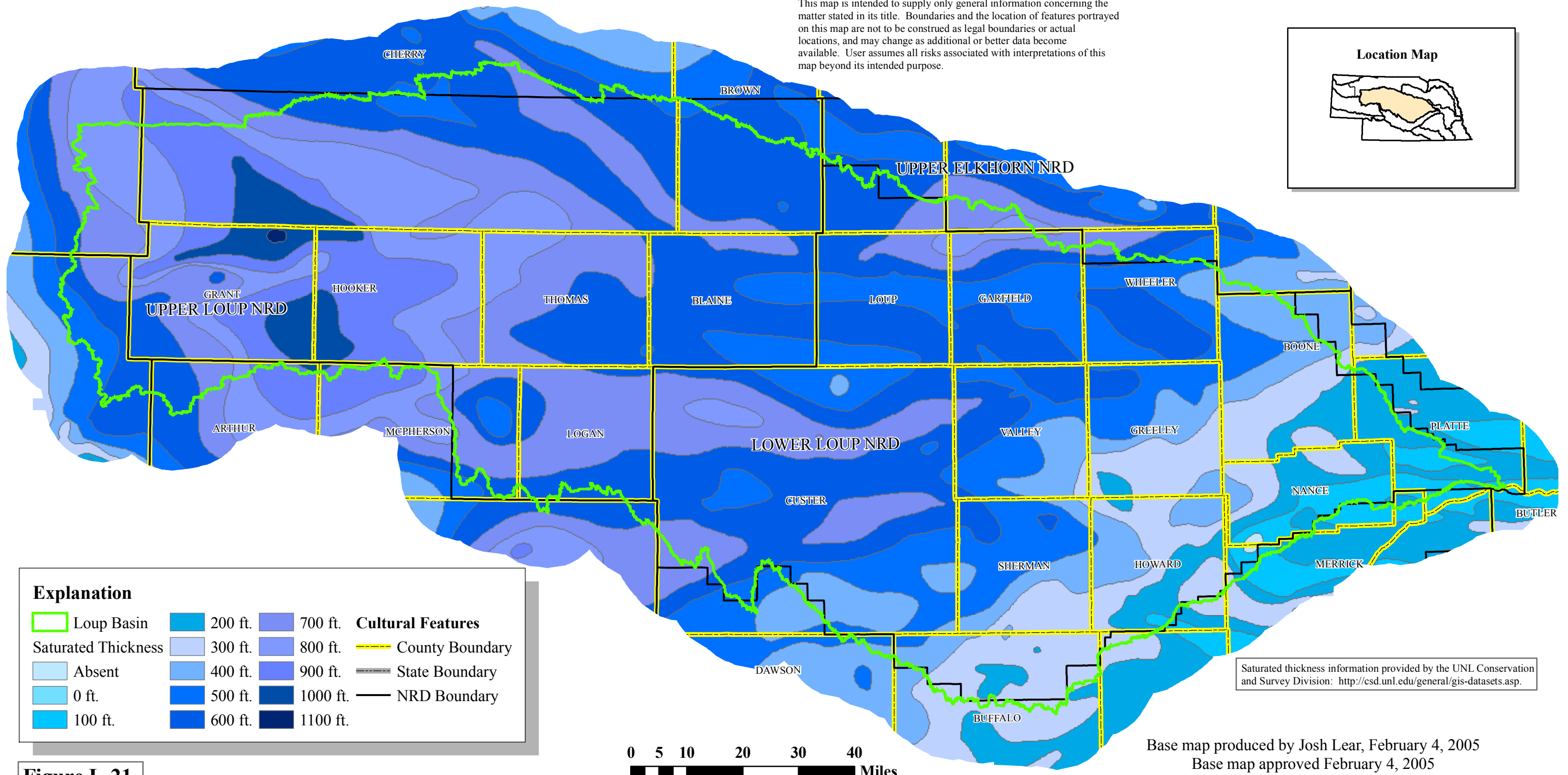
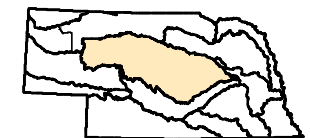
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Saturated Thickness LOUP RIVER BASIN



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Location Map



Explanation

Loup Basin	200 ft.	700 ft.	Cultural Features
Saturated Thickness	300 ft.	800 ft.	
Absent	400 ft.	900 ft.	
0 ft.	500 ft.	1000 ft.	
100 ft.	600 ft.	1100 ft.	
			County Boundary
			State Boundary
			NRD Boundary

Saturated thickness information provided by the UNL Conservation and Survey Division: <http://csd.unl.edu/general/gis-datasets.asp>.

Figure L-21.

Base map produced by Josh Lear, February 4, 2005

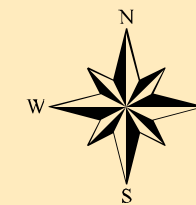
Base map approved February 4, 2005

Saturated thickness map produced by Kevin J. Schwartman, October 11, 2005

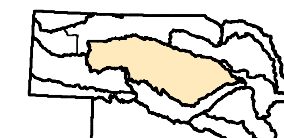


Planning and Assistance Division

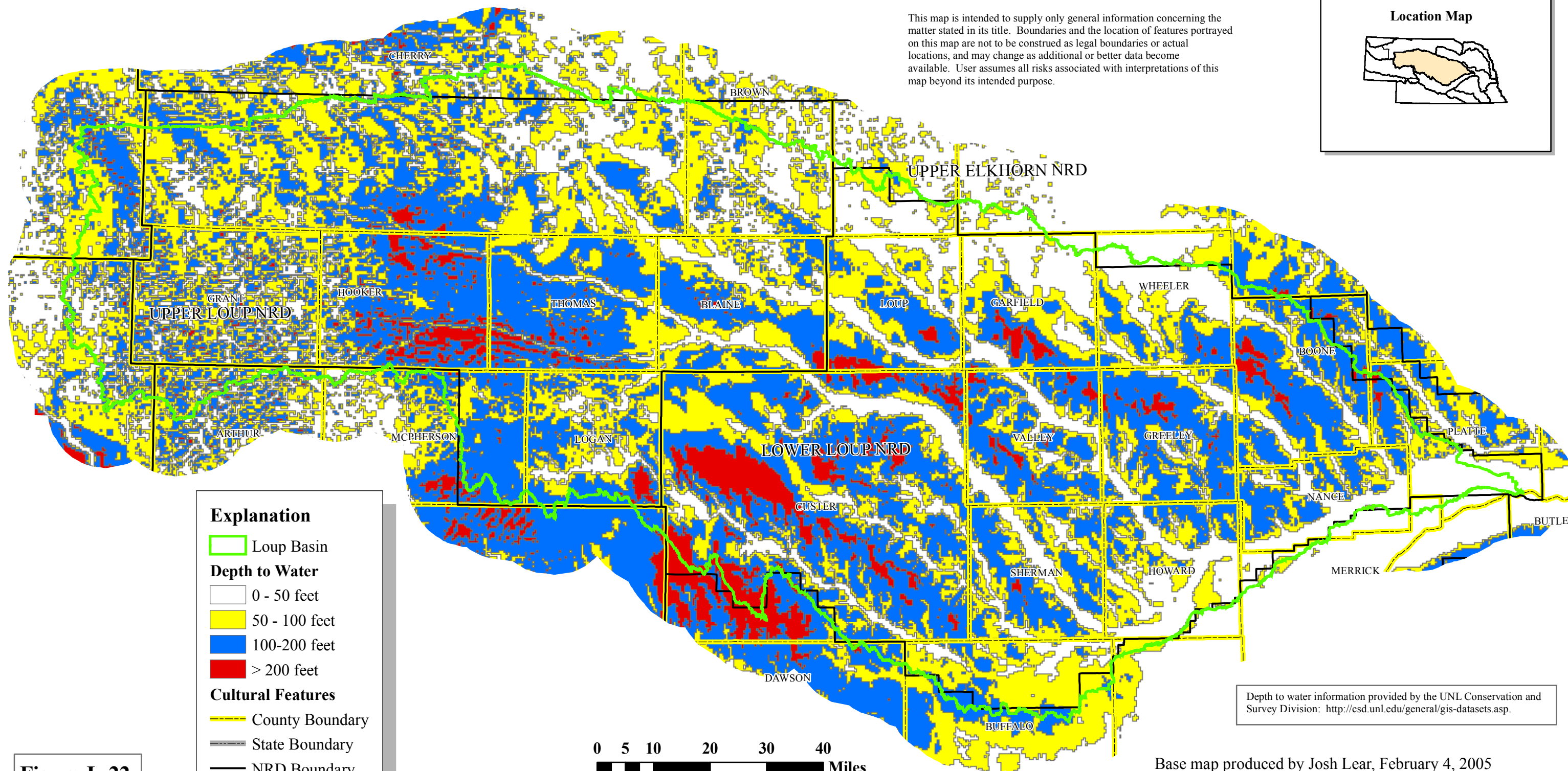
Depth to Water LOUP RIVER BASIN



Location Map



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Explanation

Loup Basin

Depth to Water

0 - 50 feet

50 - 100 feet

100-200 feet

> 200 feet

Cultural Features

County Boundary

State Boundary

NRD Boundary

0 5 10 20 30 40 Miles

Depth to water information provided by the UNL Conservation and Survey Division: <http://csd.unl.edu/general/gis-datasets.asp>.

Figure L-22.

Base map produced by Josh Lear, February 4, 2005

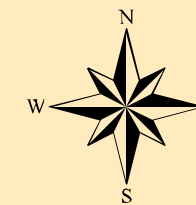
Base map approved February 4, 2005

Bedrock geology map produced by Kevin J. Schwartman, October 11, 2005



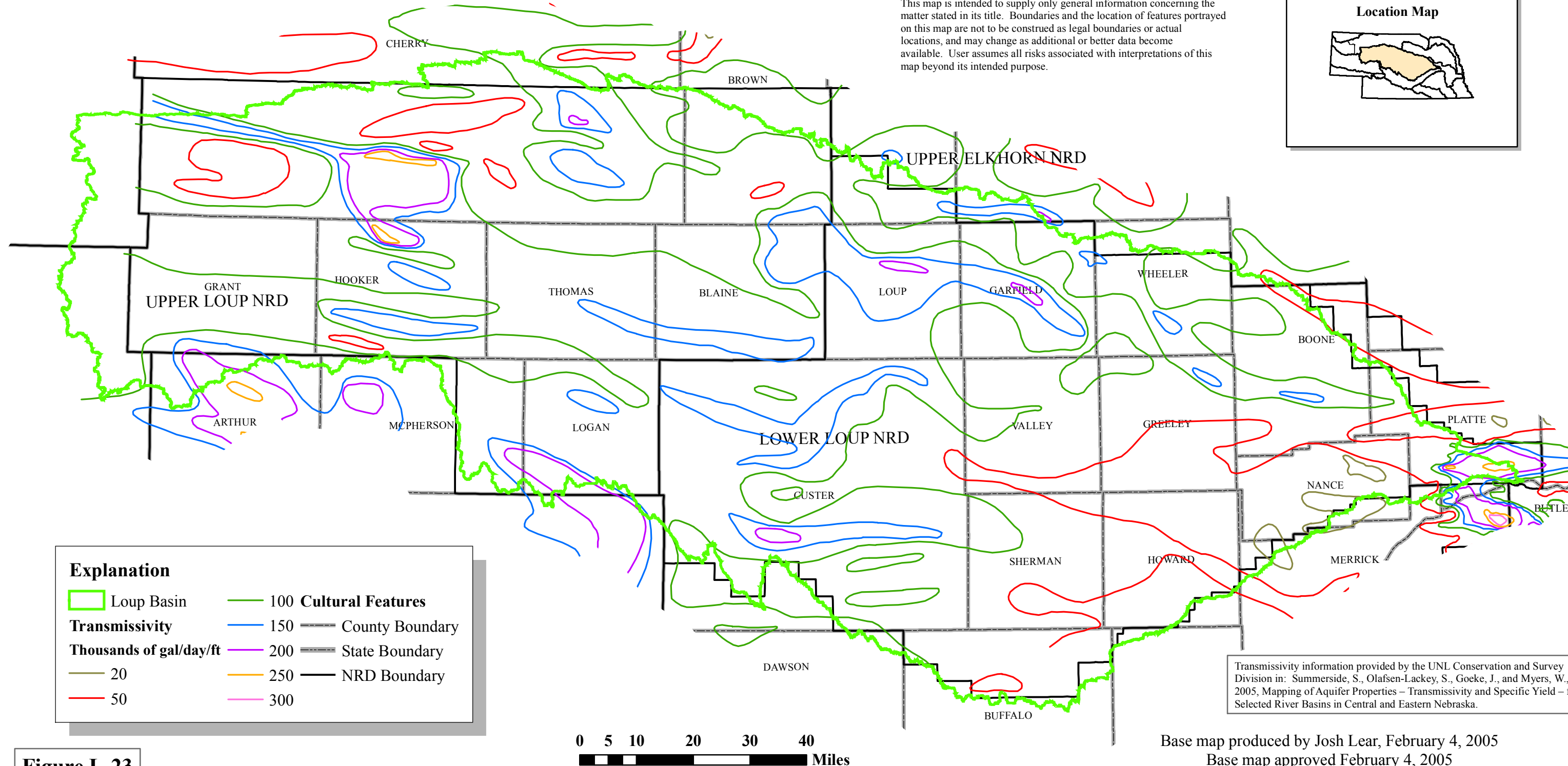
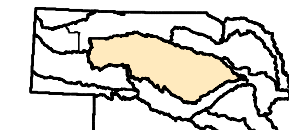
Planning and Assistance Division

Transmissivity LOUP RIVER BASIN



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Location Map



Explanation

- | | | |
|--------------------------------|-----------------------|-----------------|
| Loup Basin | 100 Cultural Features | |
| Transmissivity | 150 | County Boundary |
| Thousands of gal/day/ft | 200 | State Boundary |
| 20 | 300 | NRD Boundary |
| 50 | | |

Transmissivity information provided by the UNL Conservation and Survey Division in: Summerside, S., Olafsen-Lackey, S., Goeke, J., and Myers, W., 2005, Mapping of Aquifer Properties – Transmissivity and Specific Yield – for Selected River Basins in Central and Eastern Nebraska.

Figure L-23.

Base map produced by Josh Lear, February 4, 2005

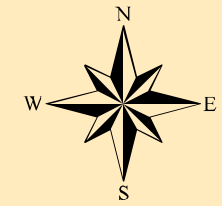
Base map approved February 4, 2005

Transmissivity map produced by Kevin J. Schwartzman, October 11, 2005



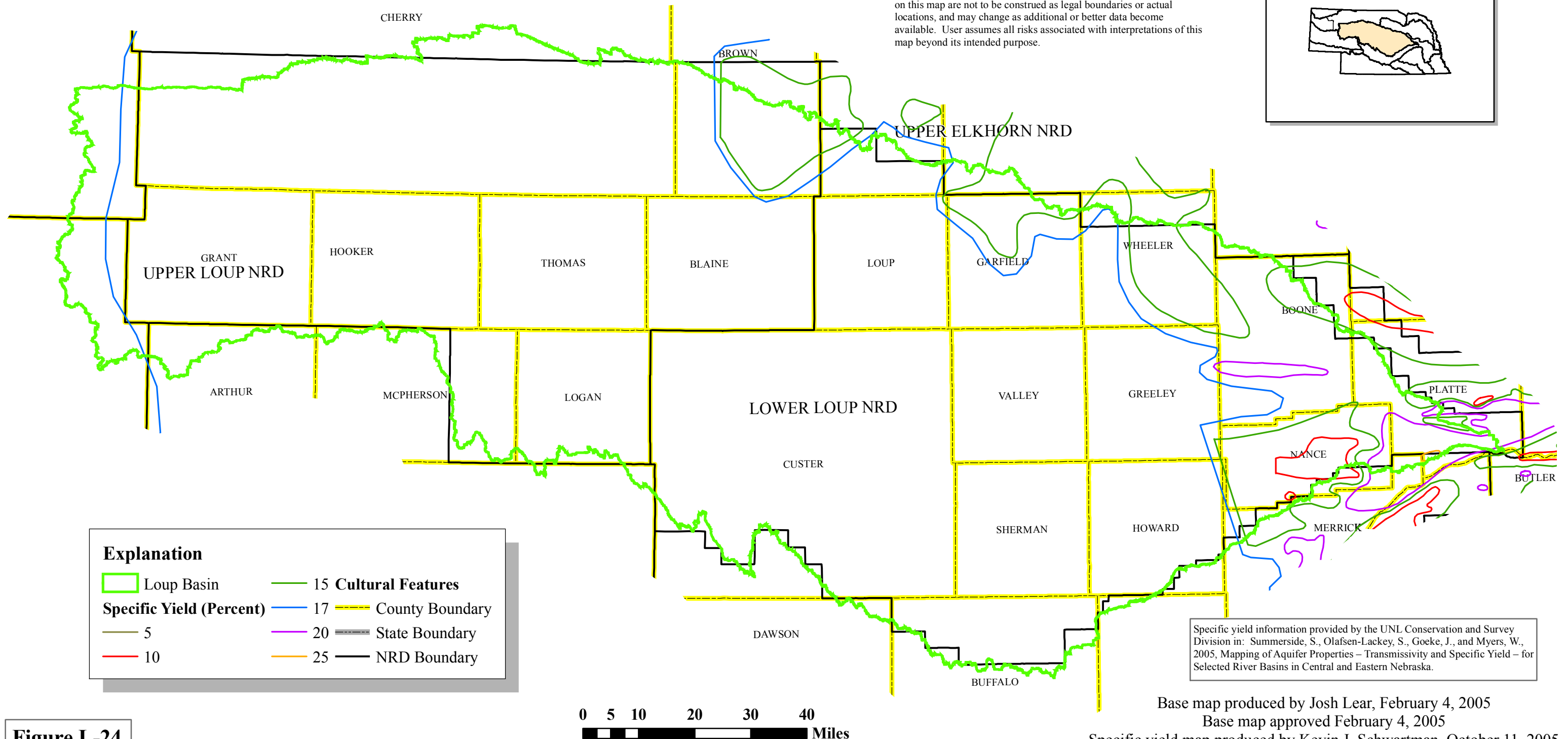
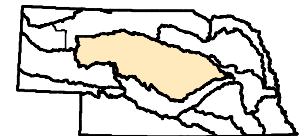
Planning and Assistance Division

Specific Yield LOUP RIVER BASIN



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Location Map



Specific yield information provided by the UNL Conservation and Survey Division in: Summerside, S., Olafsen-Lackey, S., Goeke, J., and Myers, W., 2005, Mapping of Aquifer Properties – Transmissivity and Specific Yield – for Selected River Basins in Central and Eastern Nebraska.

Base map produced by Josh Lear, February 4, 2005

Base map approved February 4, 2005

Specific yield map produced by Kevin J. Schwartman, October 11, 2005

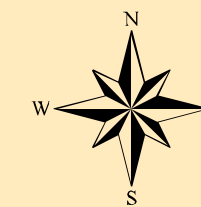
Figure L-24.



Planning and Assistance Division

1995 Ground Water Table

LOUP RIVER BASIN



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Location Map

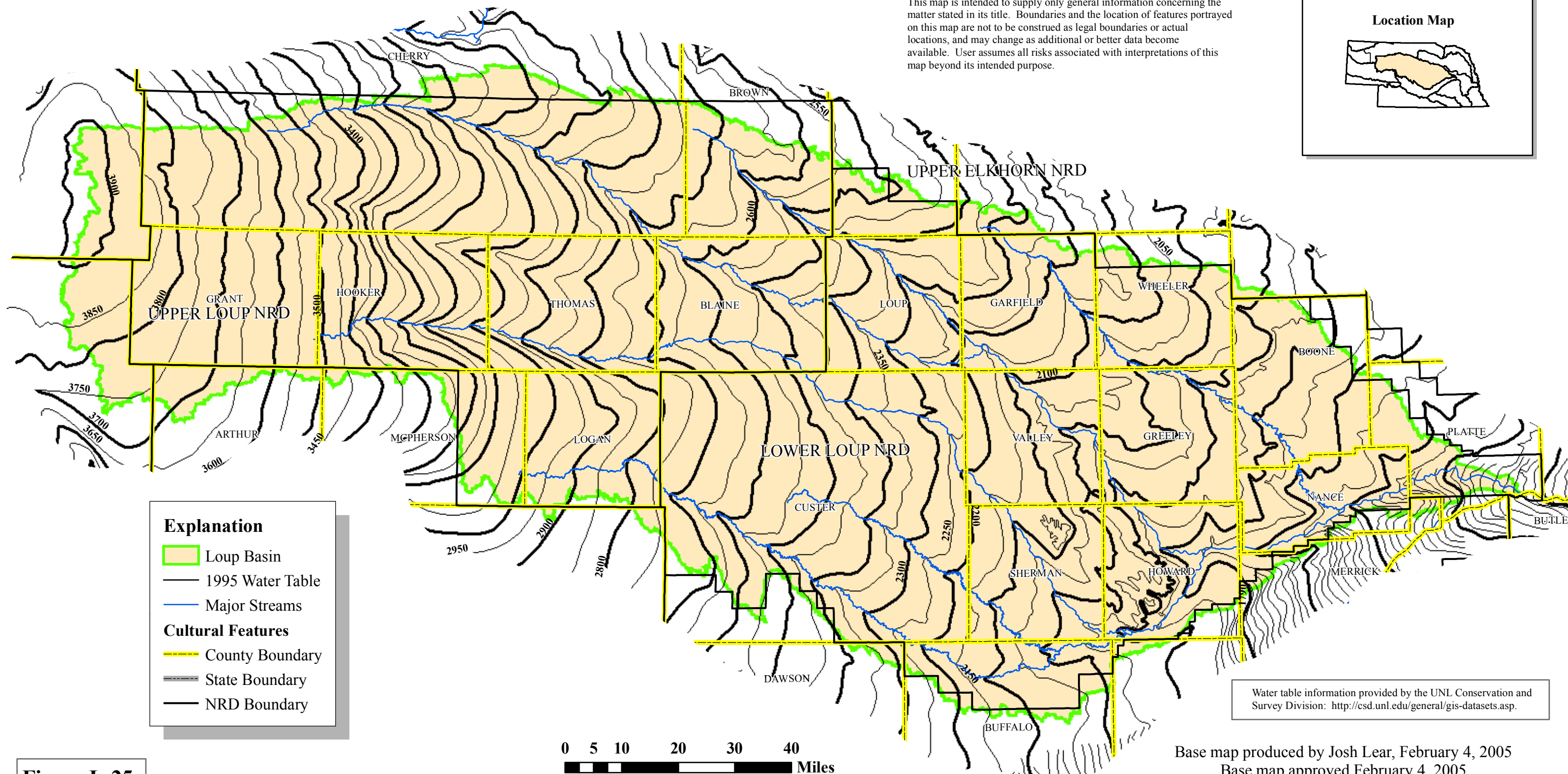
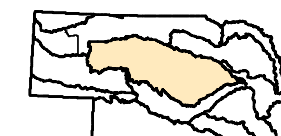


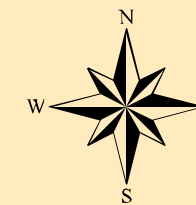
Figure L-25.



Planning and Assistance Division

Depletive Ground Water Wells

LOUP RIVER BASIN



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Location Map

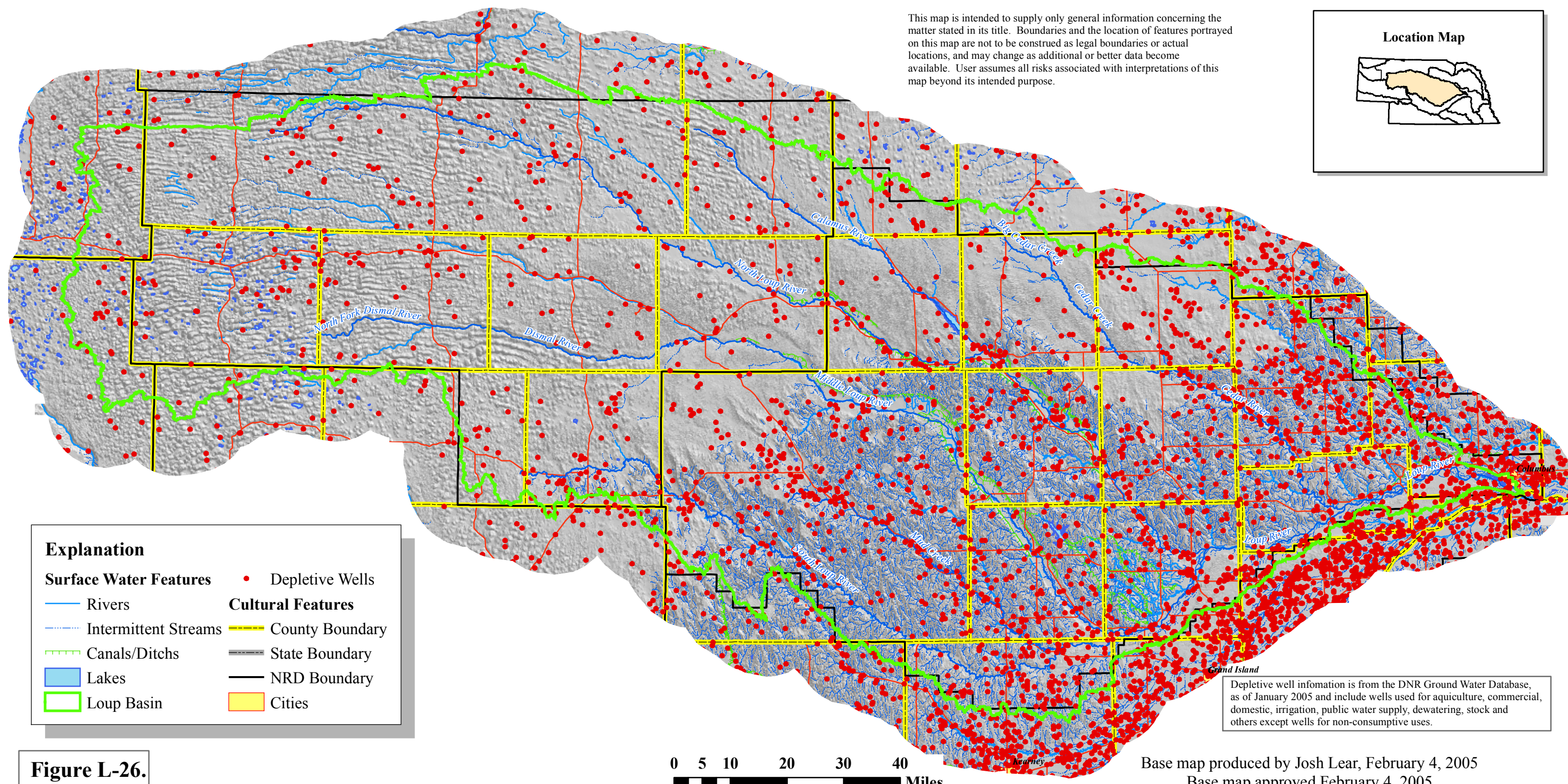
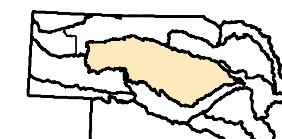


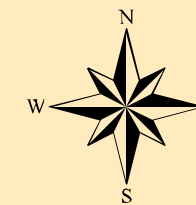
Figure L-26.



Planning and Assistance Division

High Capacity Wells by Completion Years

LOUP RIVER BASIN



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Location Map

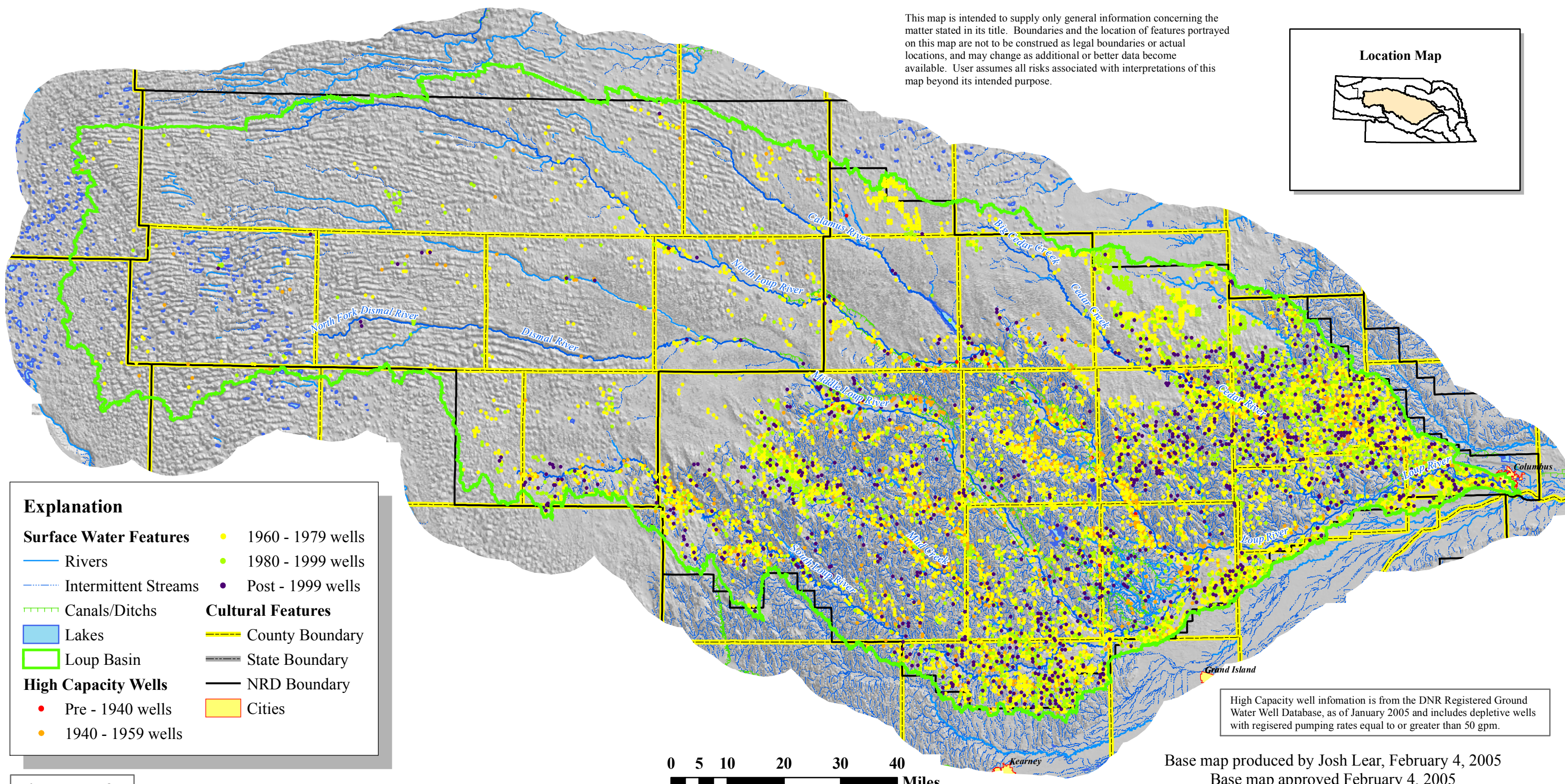
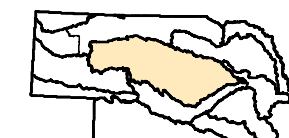
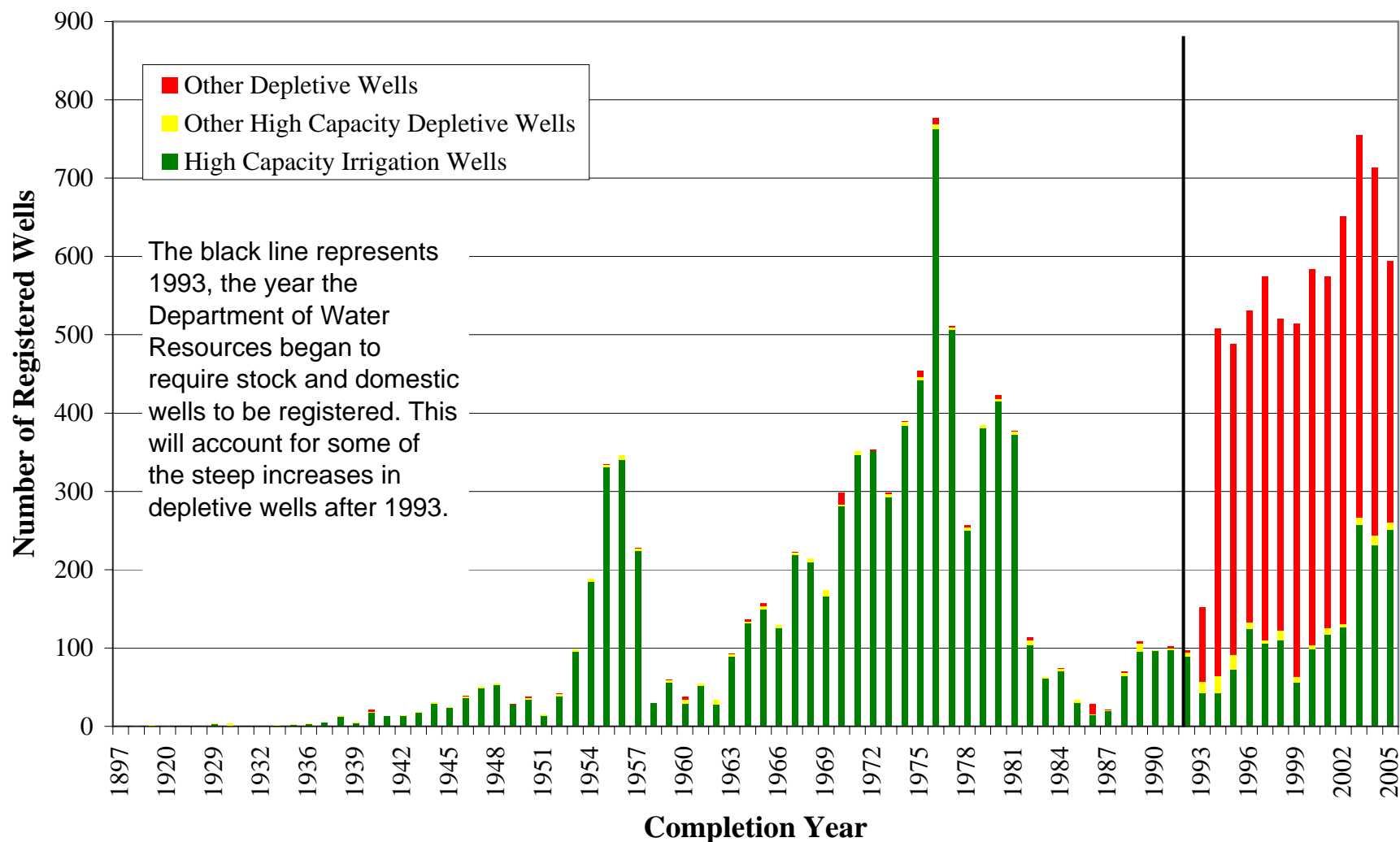


Figure L-27.

Registered Number of Depletive Wells by Completion Date Loup River Basin

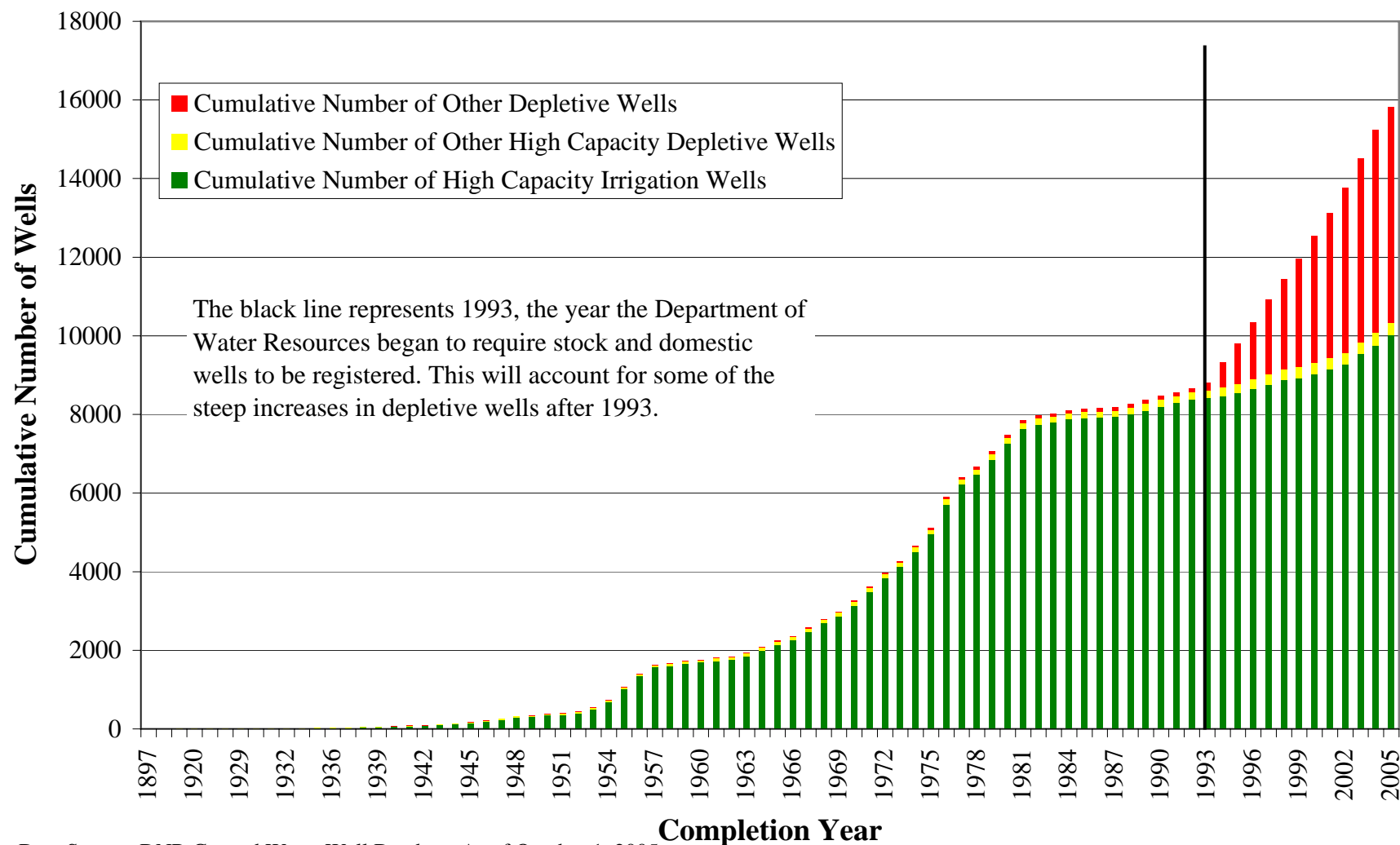


Data Source: DNR Ground Water Well Database As of October 1, 2005

Figure L-28

By Shuhai Zheng, 12/9/2005

Cumulative Number of Depletive Wells by Completion Date Loup River Basin



Data Source: DNR Ground Water Well Database As of October 1, 2005

Figure L-29

By Shuhai Zheng, 12/9/2005

Table L-3. Average Irrigated Acreage 1950-2003 for Counties Fully or Partially in the Loup River Basin

County Name	Estimated Average Irrigated Acreage by County						
	<i>Percent of County in Loup Basin</i>	<i>1950-1959</i>	<i>1960-1969</i>	<i>1970-1979</i>	<i>1980-1989</i>	<i>1990-1999</i>	<i>2000-2003</i>
Antelope	2	3140	14709	89076	160910	184990	213225
Arthur	17	46	347	3250	8830	8260	5625
Blaine	100	90	1042	7511	9220	7570	5175
Boone	85	10299	25671	63326	111210	141590	164400
Brown	40	1995	10633	46396	52650	49940	47775
Buffalo	40	60018	95577	154823	203500	210930	227375
Cherry	38	139	2852	19585	27460	26650	25350
Custer	88	18919	47711	114878	171360	192050	207600
Dawson	2	102807	127624	169535	219020	226860	238175
Garden	15	3798	9278	19728	31360	31940	31825
Garfield	96	3173	5654	12800	19450	14610	14650
Grant	100		134	910	2770	1114	1133
Greeley	100	6054	14867	37837	58930	66220	76725
Hall	3	74528	109932	152834	179920	203930	215075
Holt	3	2746	27950	133669	195120	210960	220725
Hooker	100	15	435	1260	2790	3000	2275
Howard	91	6340	31685	69820	92660	105980	108900
Lincoln	1	27188	46809	94503	159670	184990	212175
Logan	95	1323	3219	8049	16340	16820	15825
Loup	100	2462	4984	10403	10330	10670	10800
McPherson	34	35	654	4179	6860	5940	5975
Merrick	13	47192	78962	119629	145480	162730	173650

	Estimated Average Irrigated Acreage by County						
County Name	<i>Percent of County in Loup Basin</i>	<i>1950-1959</i>	<i>1960-1969</i>	<i>1970-1979</i>	<i>1980-1989</i>	<i>1990-1999</i>	<i>2000-2003</i>
Nance	89	3250	13356	33954	48950	58040	62525
Platte	30	10651	31718	77881	127710	161700	188775
Rock	20	115	1646	27958	38410	37150	36825
Sheridan	10	4211	15936	30268	52550	53330	48800
Sherman	100	7099	16077	33523	55340	64340	72475
Thomas	100	30	455	2015	3400	2500	1400
Valley	100	15787	28012	52600	65880	78520	85775
Wheeler	80	442	1804	16334	41330	42820	44050
Total		413892	769733	1608534	2319410	2566144	2765058
% Change from Previous 10 Years			85.97%	108.97%	44.19%	10.64%	7.75%

* The percentage is the percentage of the county area which is in the Loup Basin. It does not necessarily represent the percentage of irrigated county acreage in the Loup River Basin.

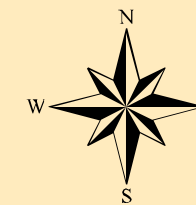
Data Source: <http://www.usda.gov/nass/>, National Agricultural Statistics Service, U.S. Department of Agriculture



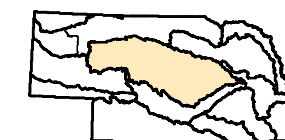
Planning and Assistance Division

Ground Water-level Changes Pre-development to 2005

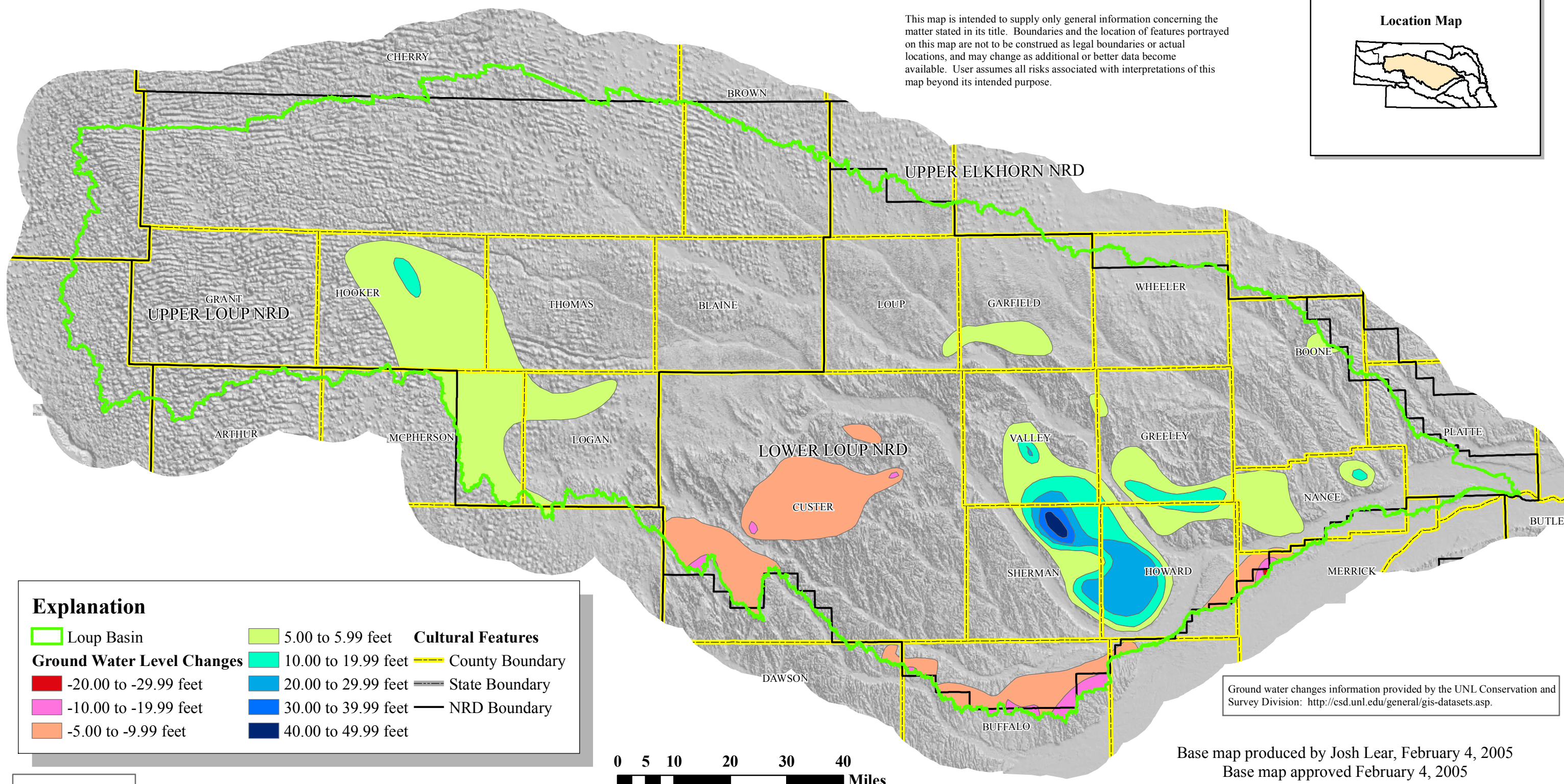
LOUP RIVER BASIN



Location Map



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Explanation

- | | | |
|-----------------------------------|---------------------|--------------------------|
| Loup Basin | 5.00 to 5.99 feet | Cultural Features |
| Ground Water Level Changes | 10.00 to 19.99 feet | County Boundary |
| -20.00 to -29.99 feet | 20.00 to 29.99 feet | State Boundary |
| -10.00 to -19.99 feet | 30.00 to 39.99 feet | NRD Boundary |
| -5.00 to -9.99 feet | 40.00 to 49.99 feet | |

Ground water changes information provided by the UNL Conservation and Survey Division: <http://csd.unl.edu/general/gis-datasets.asp>.

Figure L-30.

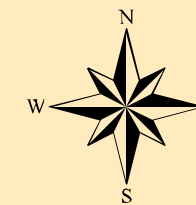
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Ground water-level changes added by Shuhai Zheng, October 11, 2005



Planning and Assistance Division

Hydrograph Locations

LOUP RIVER BASIN



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Location Map

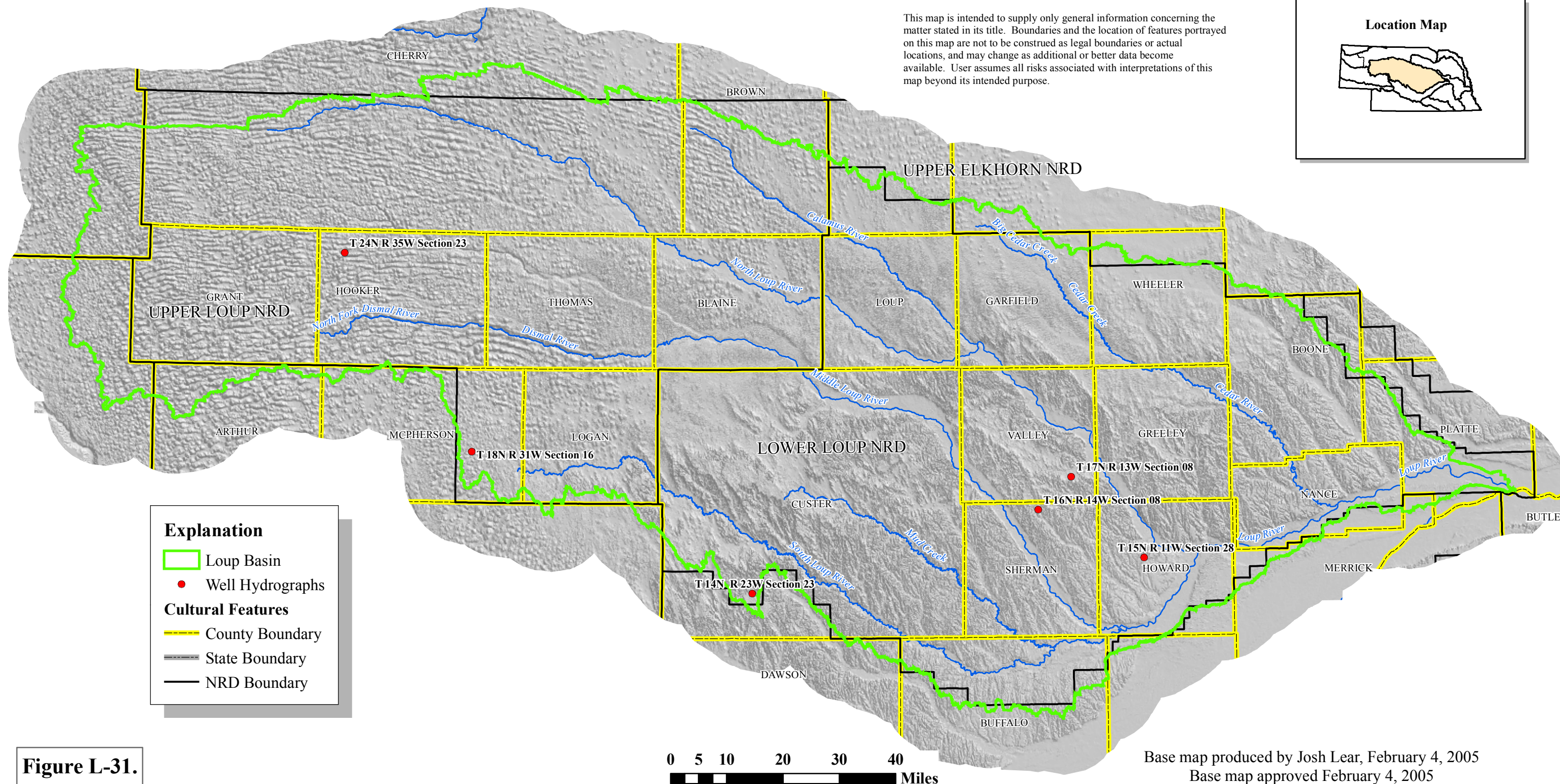
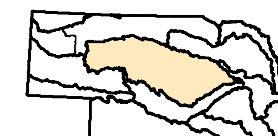


Figure L-31.

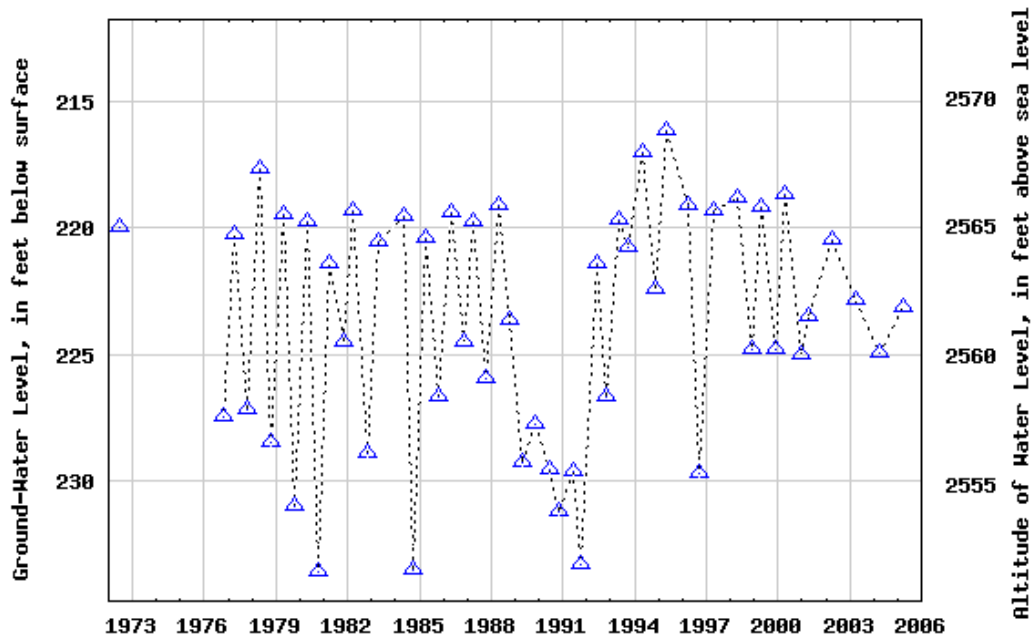
Base map produced by Josh Lear, February 4, 2005

Base map approved February 4, 2005

Precipitation gages map produced by Kevin Schwartman, November 2, 2005.



USGS 411013099554601 14N 23W23BCCC1



Provisional Data Subject to Revision

Custer County, Nebraska

Hydrologic Unit Code 10210004

Latitude 41°10'13", Longitude 99°55'46" NAD27

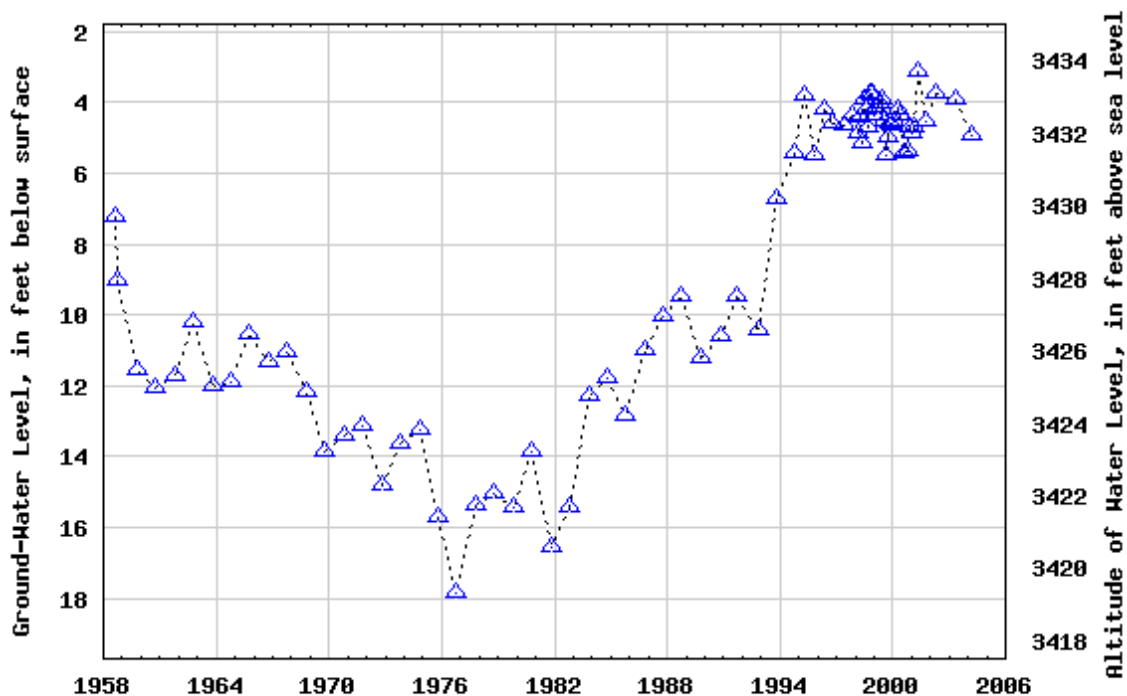
Land-surface elevation 2,785. feet above sea level NGVD29

The depth of the well is 481.0 feet below land surface. This well is completed in the TERTIARY OGALLALA GROUP DEPOSITS (112SDGV) regional aquifer.

Figure L-32



USGS 420204101200501 24N 35W23DC 1



Provisional Data Subject to Revision

Hooker County, Nebraska

Hydrologic Unit Code 10210001

Latitude 42°02'04", Longitude 101°20'05" NAD27

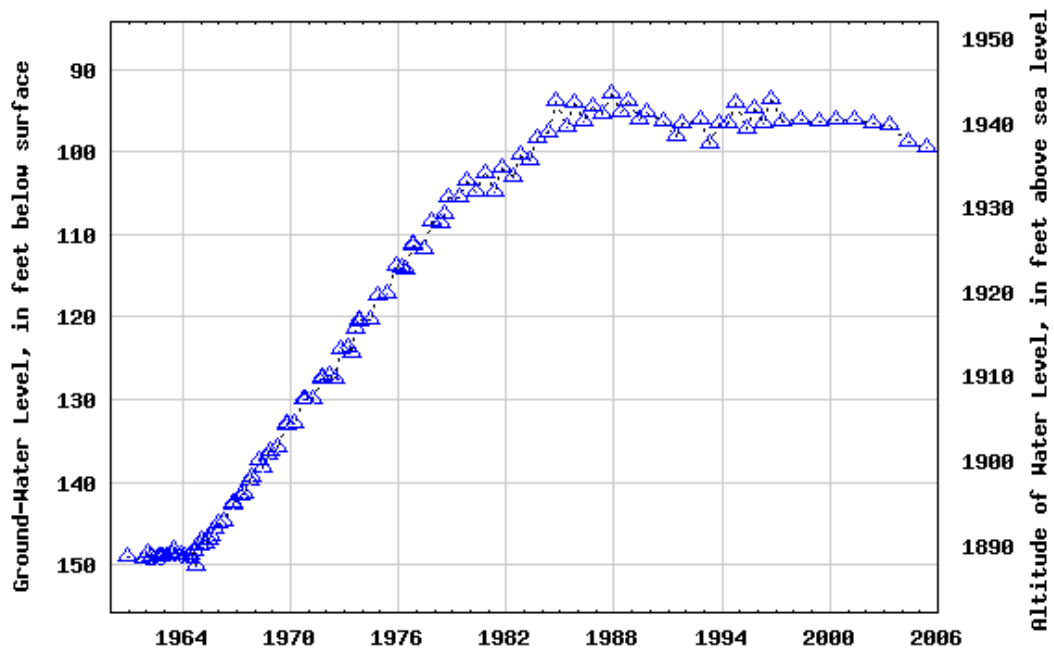
Land-surface elevation 3,437.00 feet above sea level NGVD29

The depth of the well is 20.0 feet below land surface. This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure LB-33



USGS 411453098351801 15N 11W28BB 1



Provisional Data Subject to Revision

Howard County, Nebraska

Hydrologic Unit Code 10210007

Latitude 41°14'53", Longitude 98°35'18" NAD27

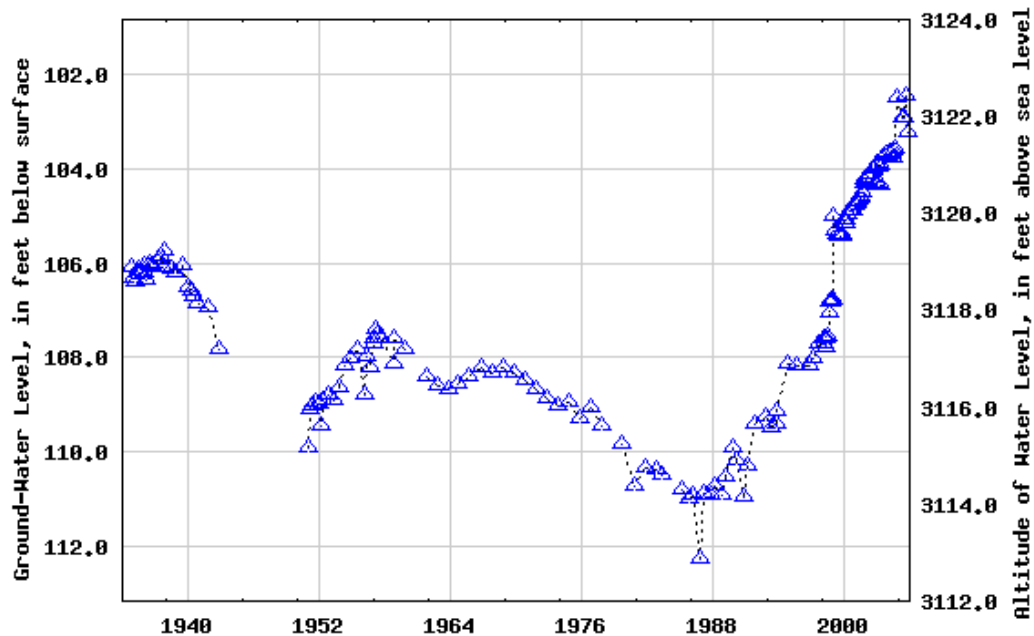
Land-surface elevation 2,037.00 feet above sea level NGVD29

The depth of the well is 182 feet below land surface. This well is completed in the TERTIARY OGALLALA GROUP DEPOSITS (112SDGV) regional aquifer.

Figure LB-34



USGS 413130100531201 18N 31W16DD 1 TRYON



Provisional Data Subject to Revision

McPherson County, Nebraska

Hydrologic Unit Code 10210004

Latitude 41°31'30", Longitude 100°53'12" NAD27

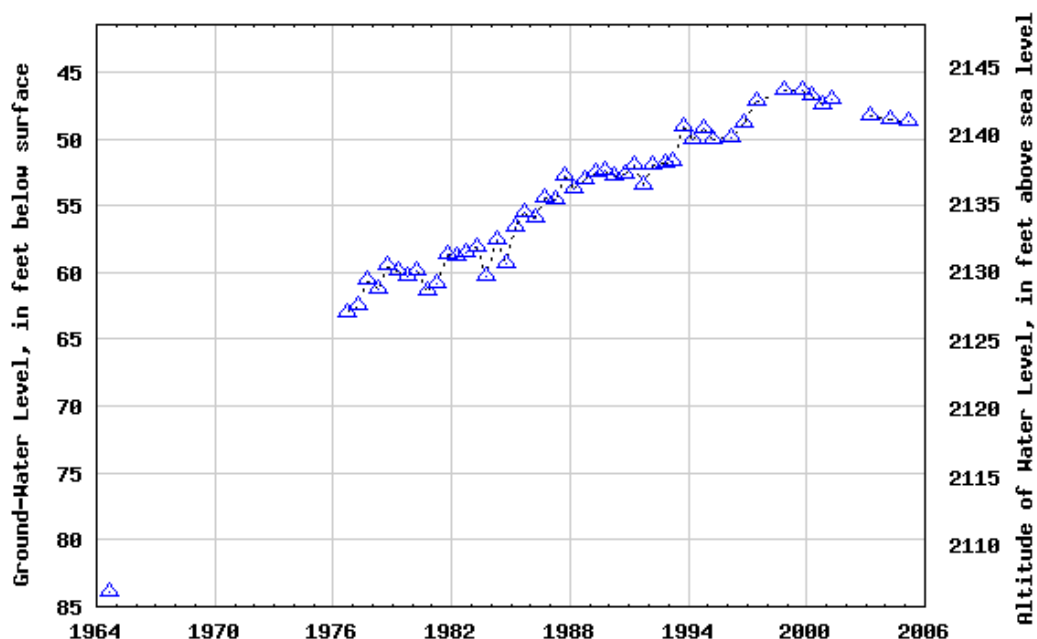
Land-surface elevation 3,225.00 feet above sea level NGVD29

The depth of the well is 120 feet below land surface. This well is completed in the QUATERNARY SAND DEPOSITS (112SDGV) local aquifer.

Figure LB-35



USGS 412228098565002 16N 14W 8BD 2



Provisional Data Subject to Revision

Sherman County, Nebraska

Hydrologic Unit Code 10210003

Latitude 41°22'28", Longitude 98°56'50" NAD27

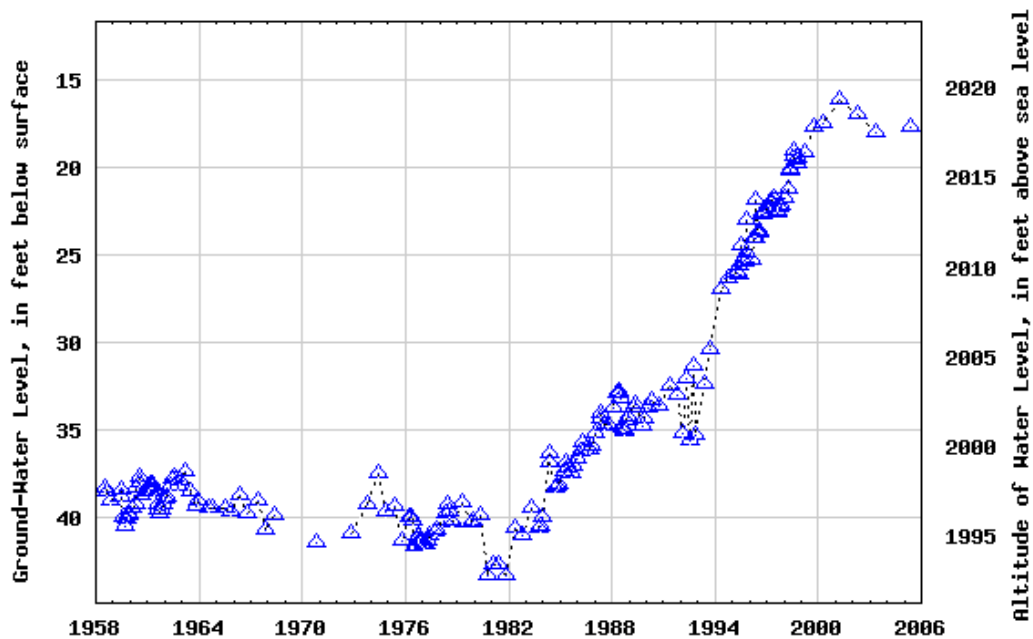
Land-surface elevation 2,190. feet above sea level NGVD29

The depth of the well is 199.0 feet below land surface. This well is completed in the TERTIARY OGALLALA GROUP DEPOSITS (112SDGV) regional aquifer.

Figure LB-36



USGS 412727098495101 17N 13W 8DAAA1



Provisional Data Subject to Revision

Valley County, Nebraska

Hydrologic Unit Code 10210007

Latitude 41°27'27", Longitude 98°49'51" NAD27

Land-surface elevation 2,035.71 feet above sea level NGVD29

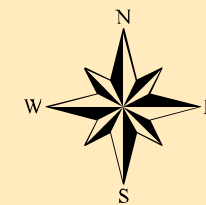
The depth of the well is 94.0 feet below land surface. This well is completed in the QUATERNARY SAND DEPOSITS (112SDGV) local aquifer just above the TERTIARY OGALLALA GROUP DEPOSITS regional aquifer.

Figure LB-37



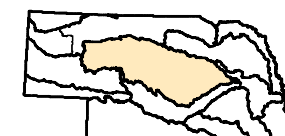
Planning and Assistance Division

Stream Gages LOUP RIVER BASIN



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Location Map



Explanation

- Loup Basin
- Stream Gages
- Cultural Features**
- County Boundary
- State Boundary
- NRD Boundary

Figure L-38.

0 5 10 20 30 40
Miles

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Stream gages map produced by Jeff Shafer, October 19, 2005.

Figure L-39. Annual Flows, Beaver Creek at Loretto.

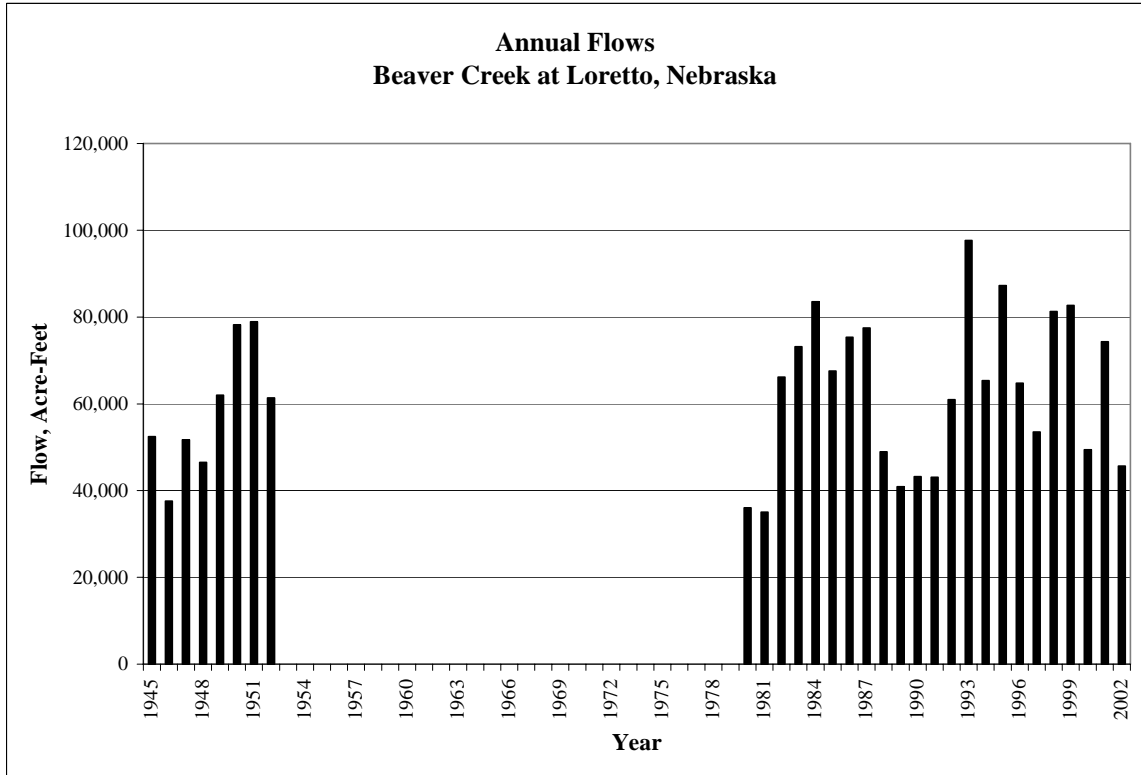


Figure L-40. Annual Flows, Beaver Creek at Genoa.

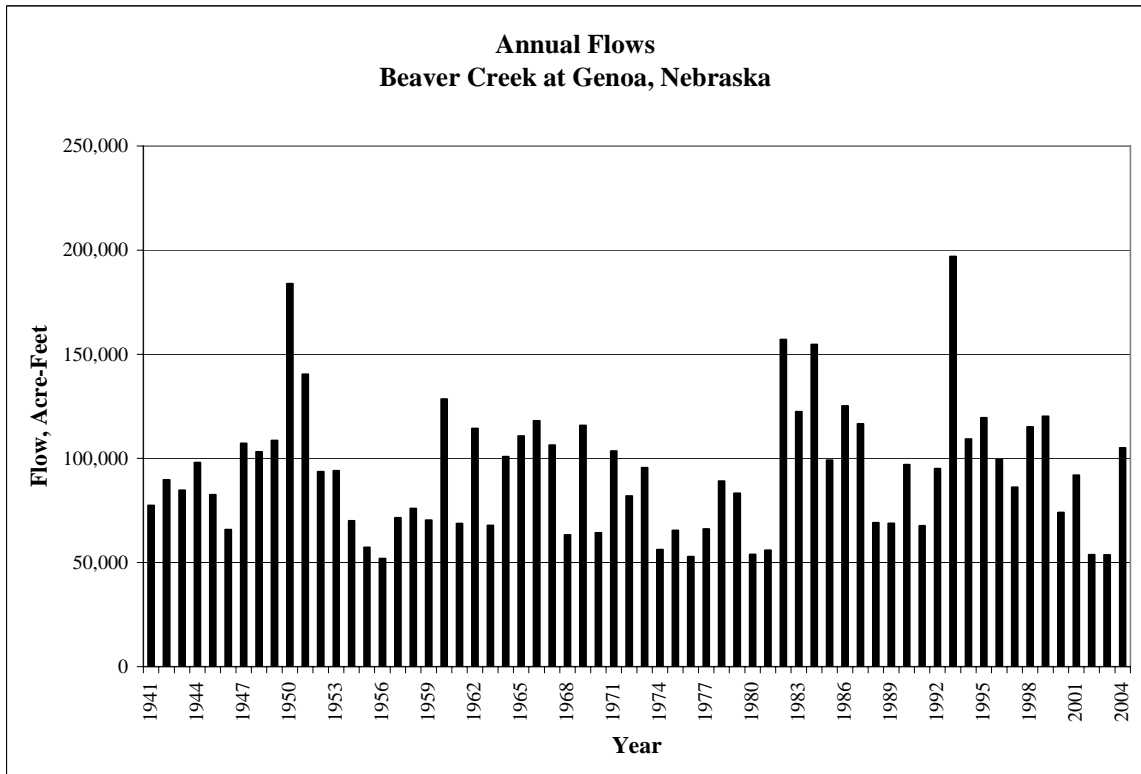


Figure L-41. Annual Flows, Cedar River near Spalding.

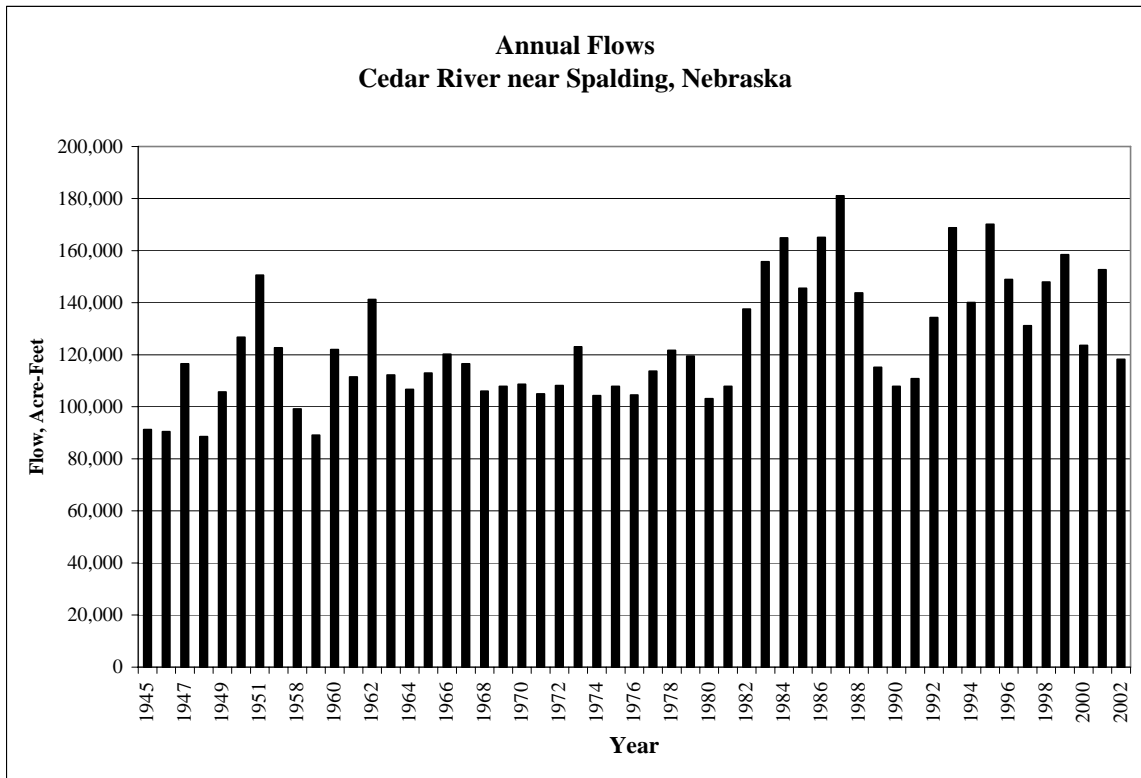


Figure L-42. Annual Flows, Cedar River near Fullerton.

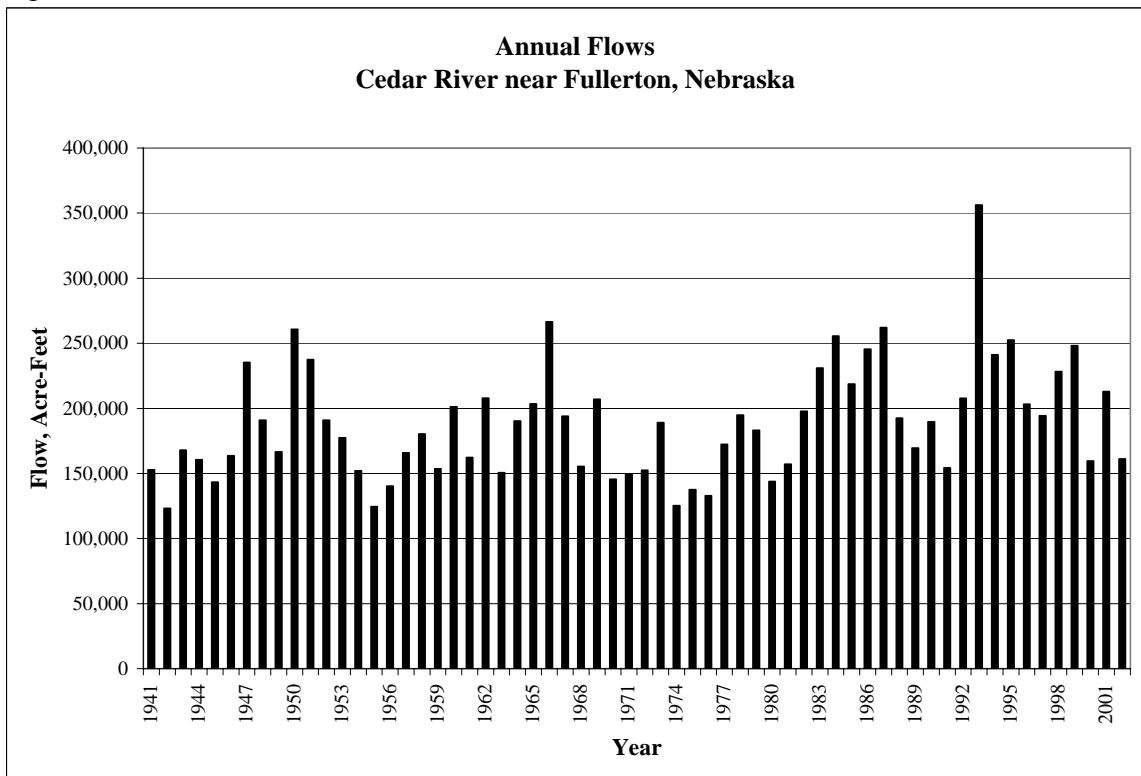


Figure L-43. Annual Flows, Dismal River at Dunning.

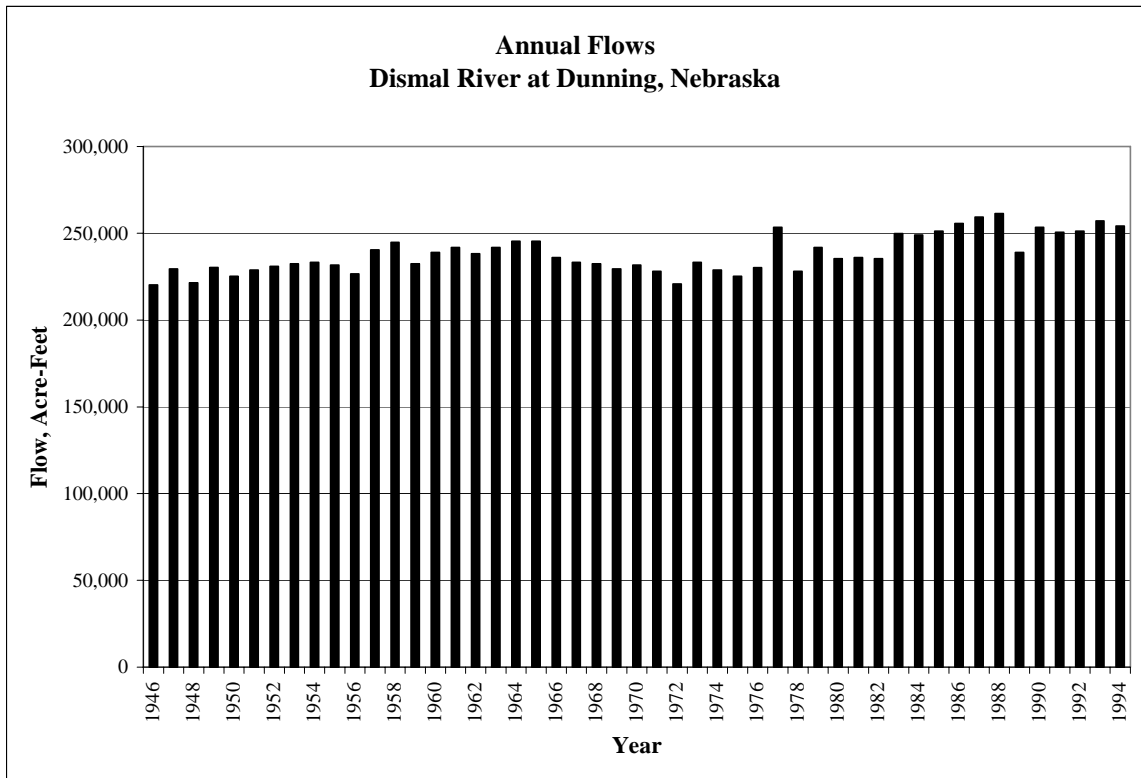


Figure L-44. Annual Flows, Dismal River near Thedford.

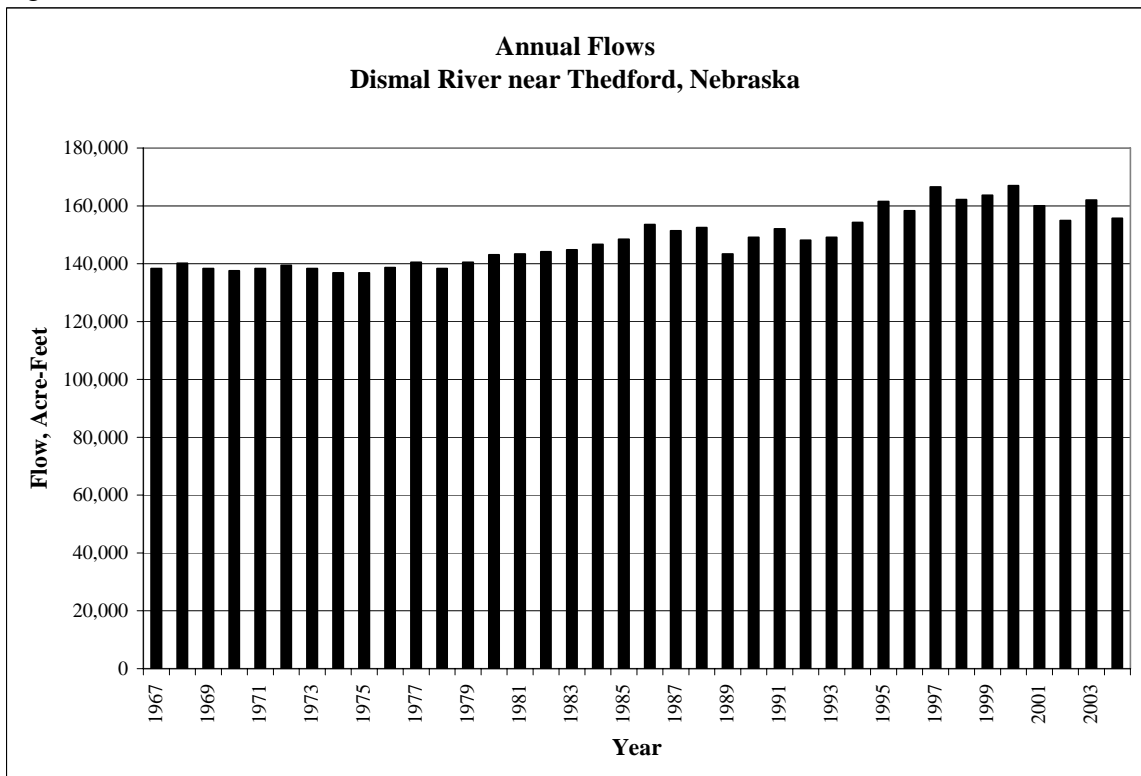


Figure L-45. Annual Flows, Mira Creek near North Loup.

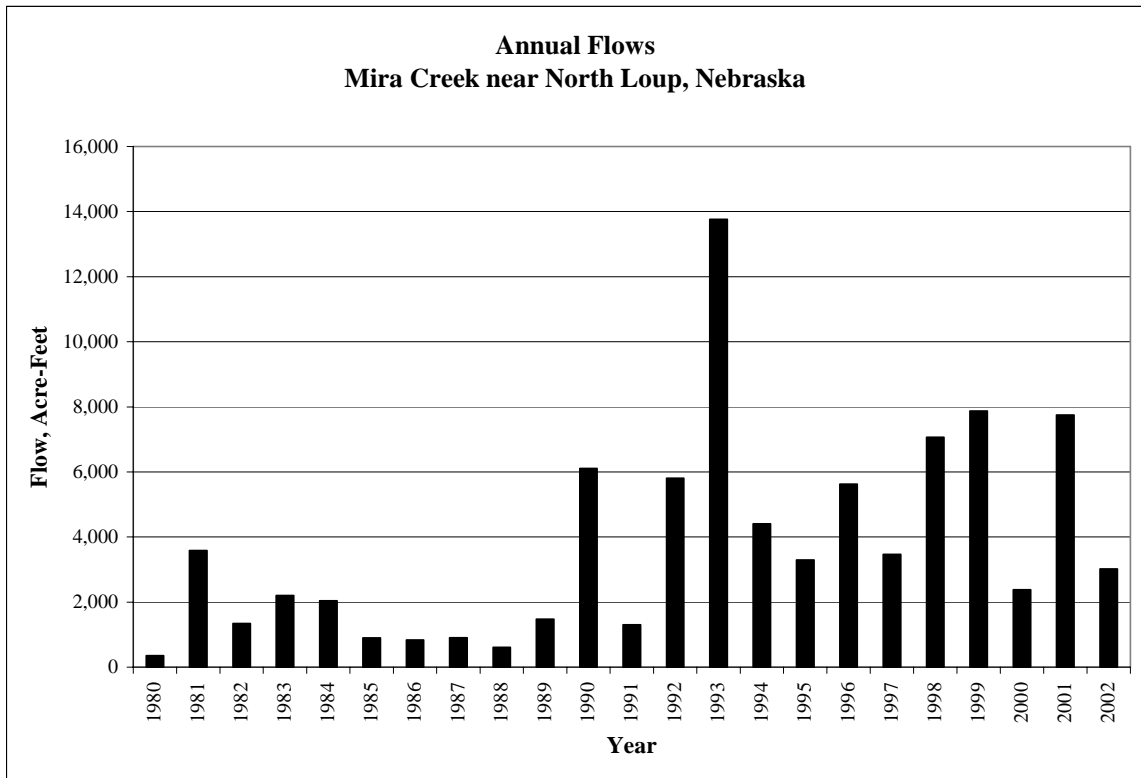


Figure L-46. Annual Flows, Mud Creek near Sweetwater.

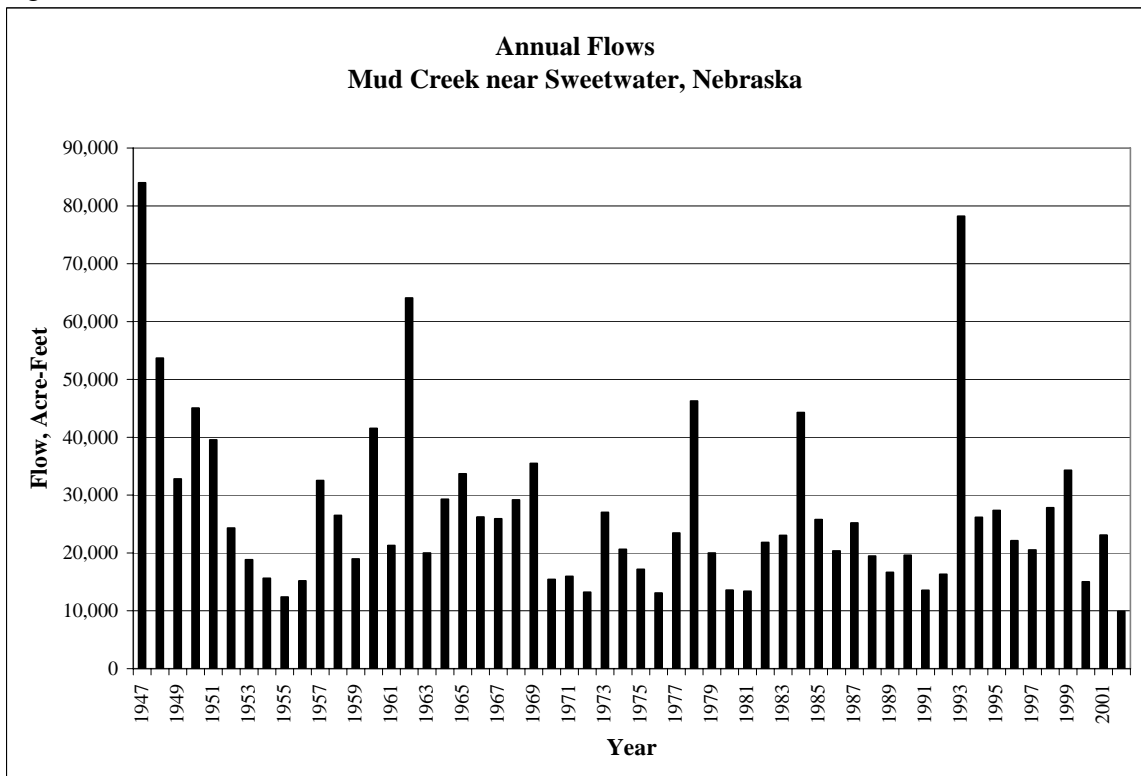


Figure L-47 Annual Flows, Calamus River near Burwell.

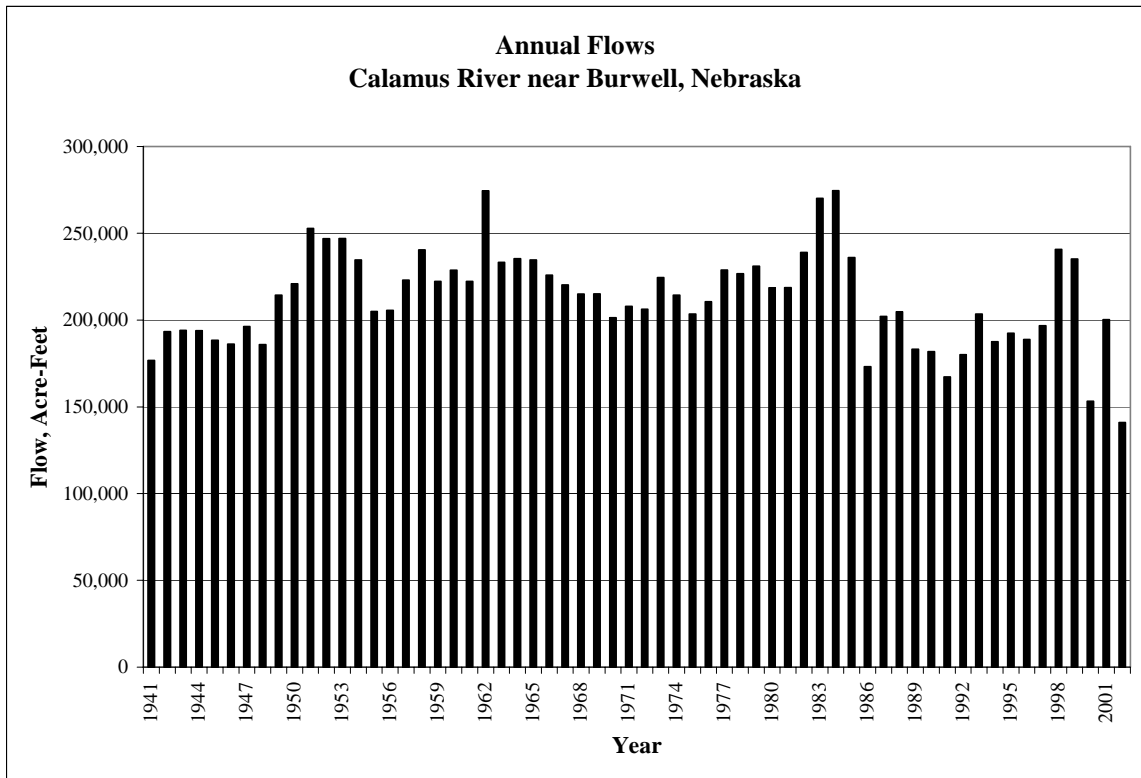


Figure L-48. Annual Flows, Calamus River near Harrop.

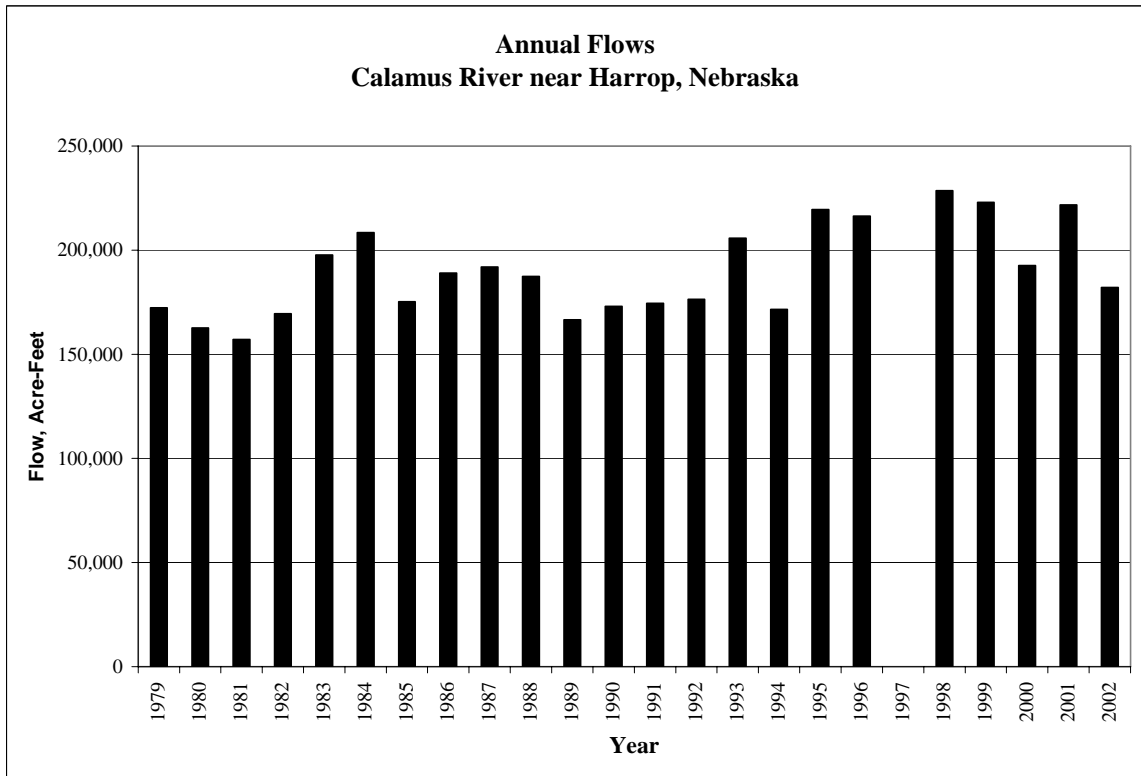


Figure L-49. Annual Flows, South Loup River at St. Michael.

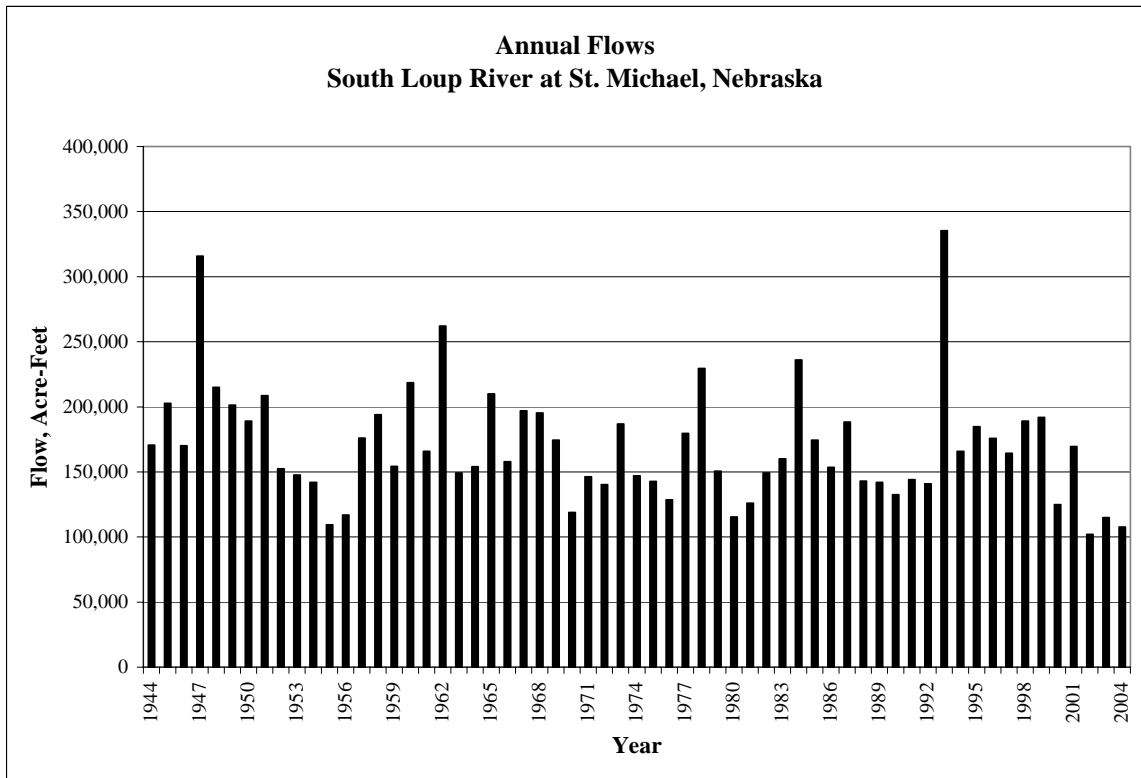


Figure L-50. Annual Flows, Middle Loup River at Dunning.

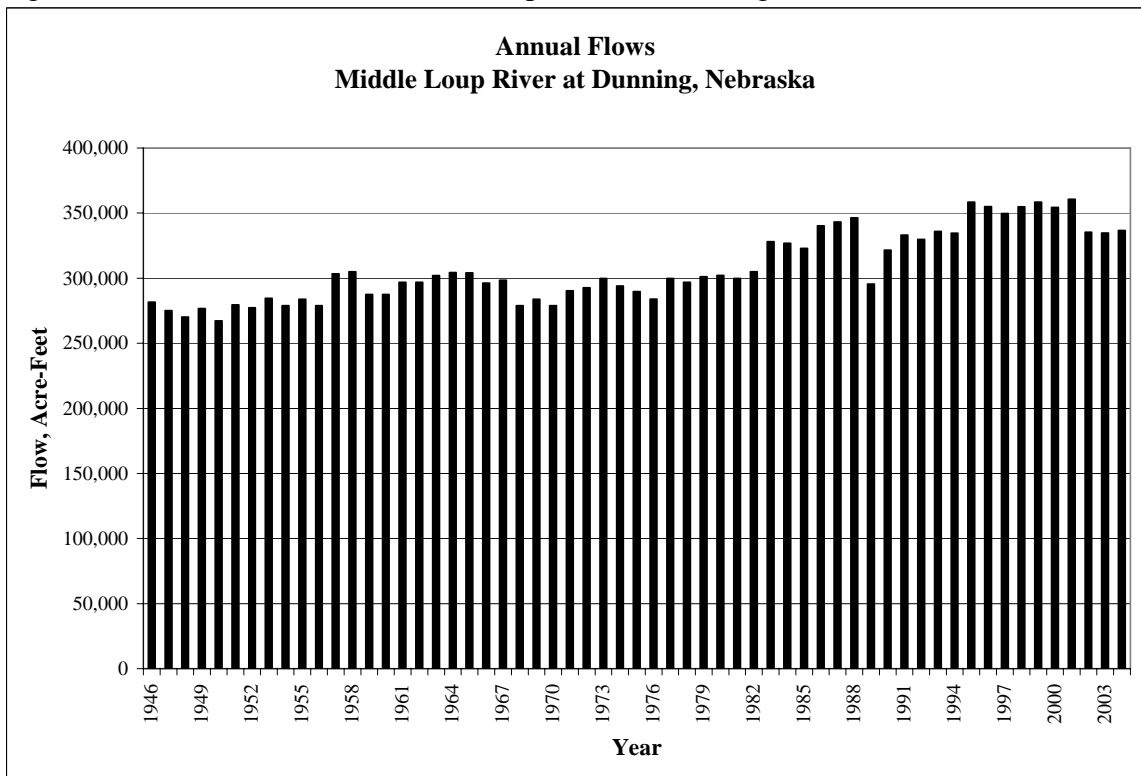


Figure L-51. Annual Flows. Middle Loup River at Arcadia.

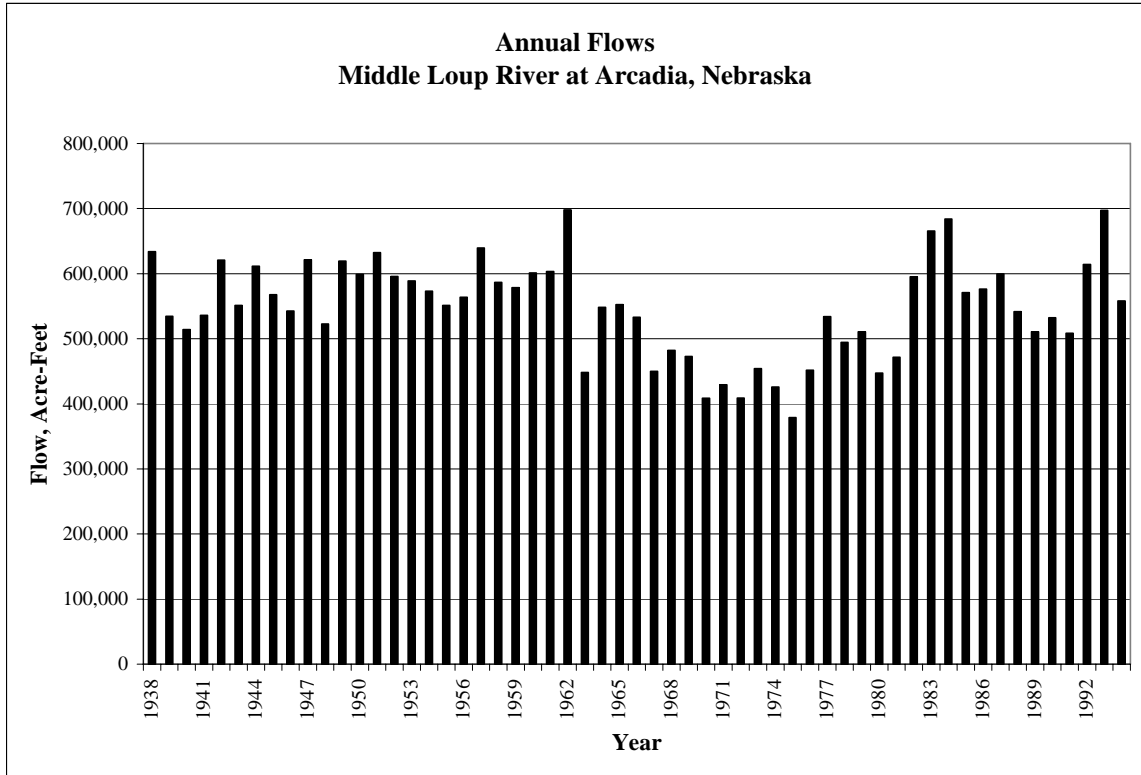


Figure L-52. Annual Flows, Middle Loup River at St. Paul.

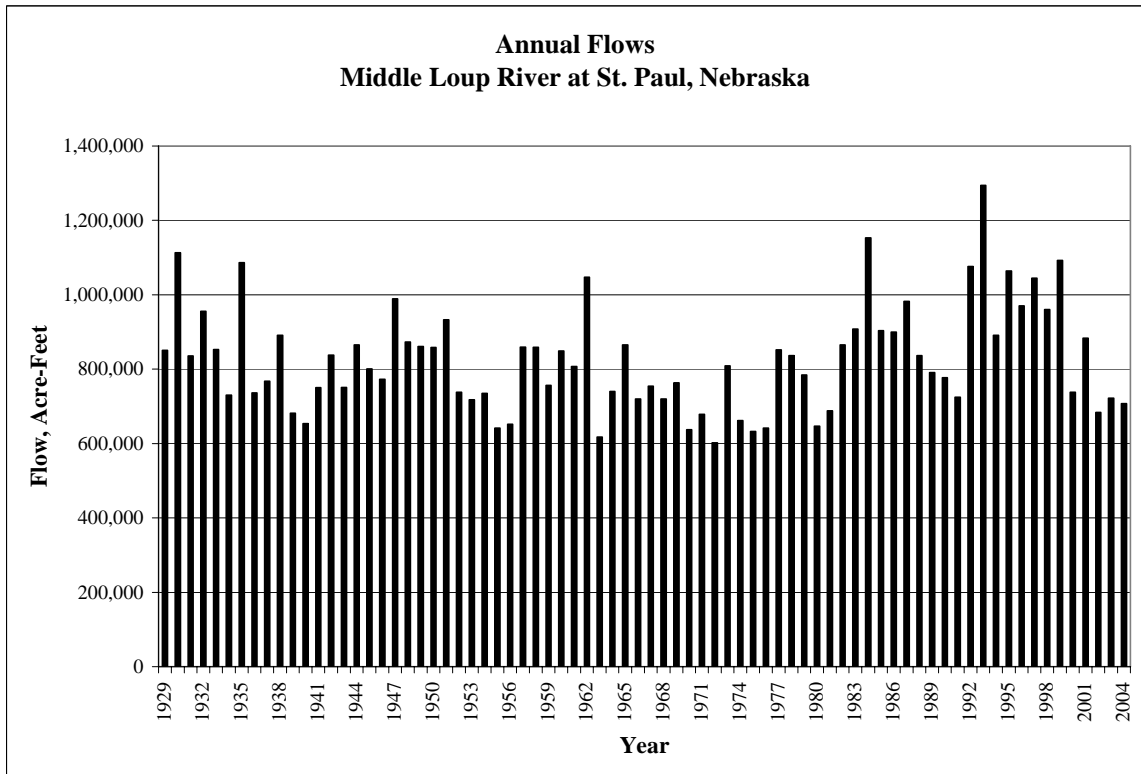


Figure L-53. Annual Flows, North Loup River at Taylor.

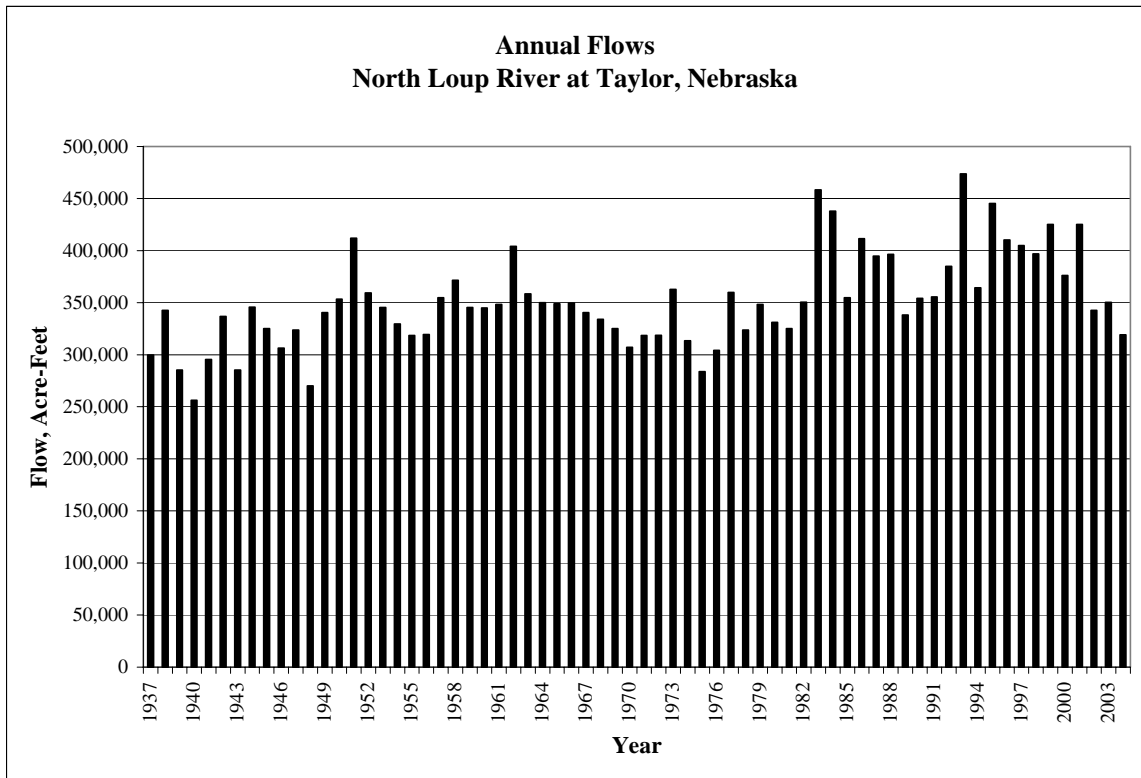


Figure L-54. Annual Flows, North Loup River at Ord.

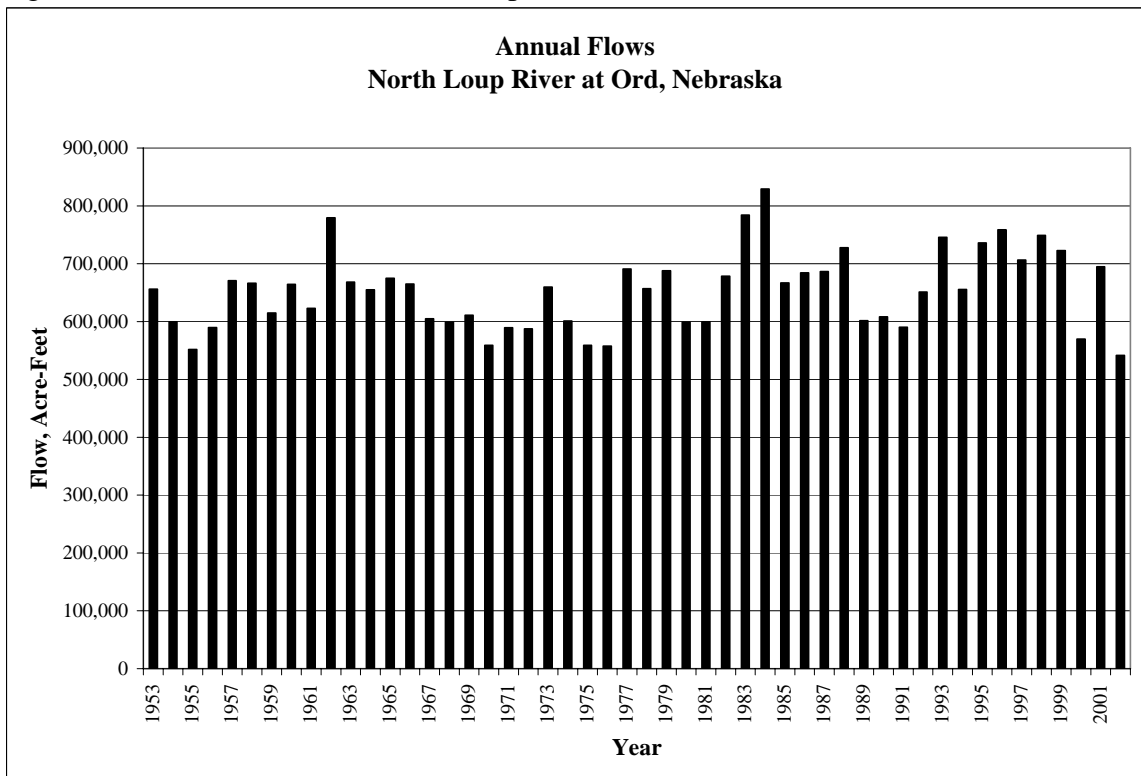


Figure L-55. Annual Flows, North Loup River near St. Paul.

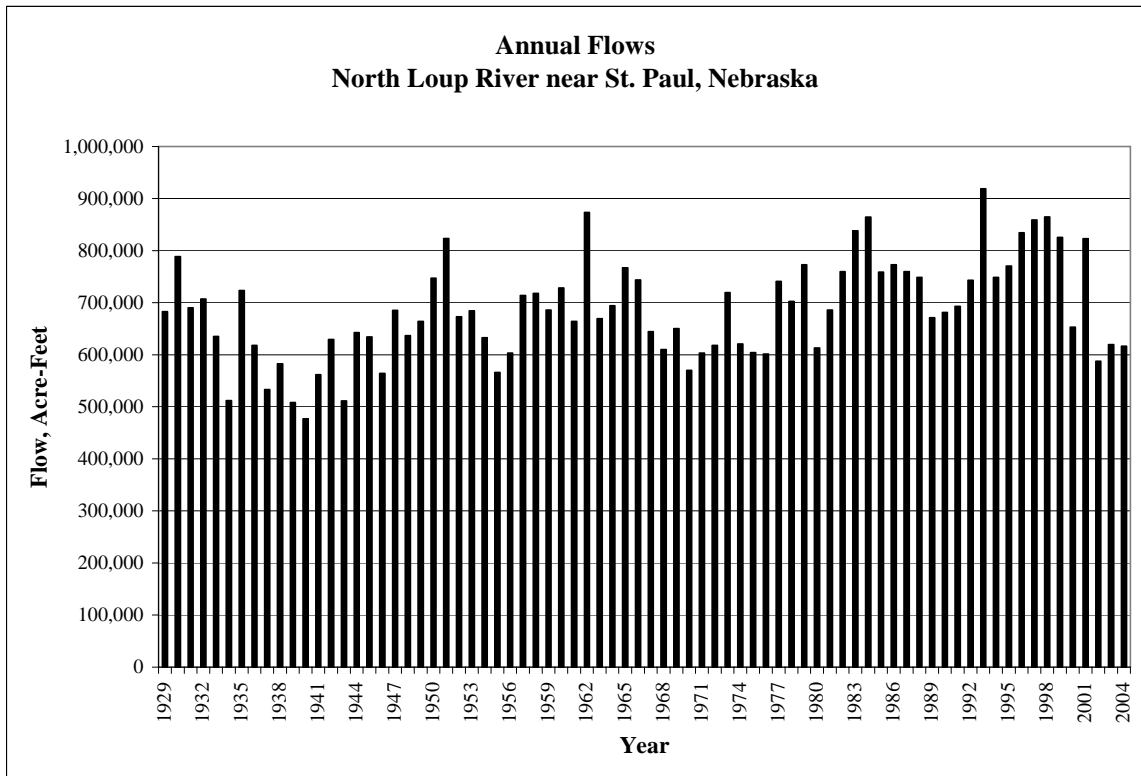
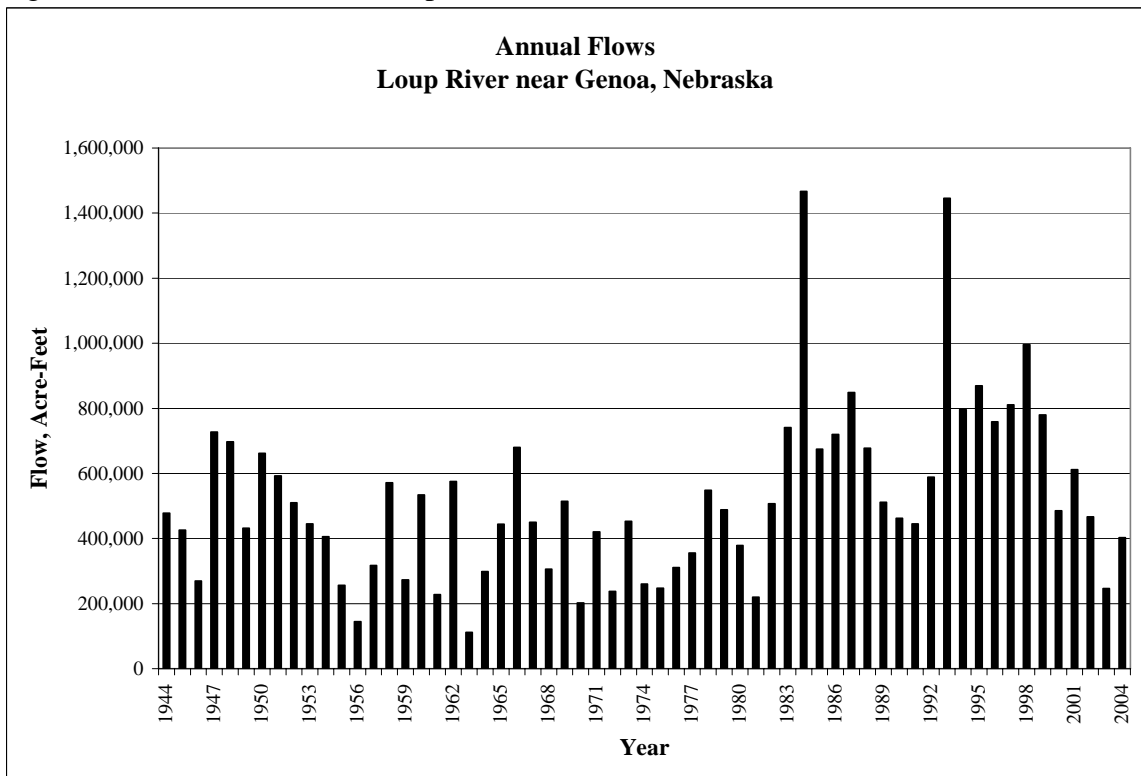


Figure L-56. Annual Flows, Loup River near Genoa.



Cumulative Number of Surface Water Appropriations in Loup River Basin by Use

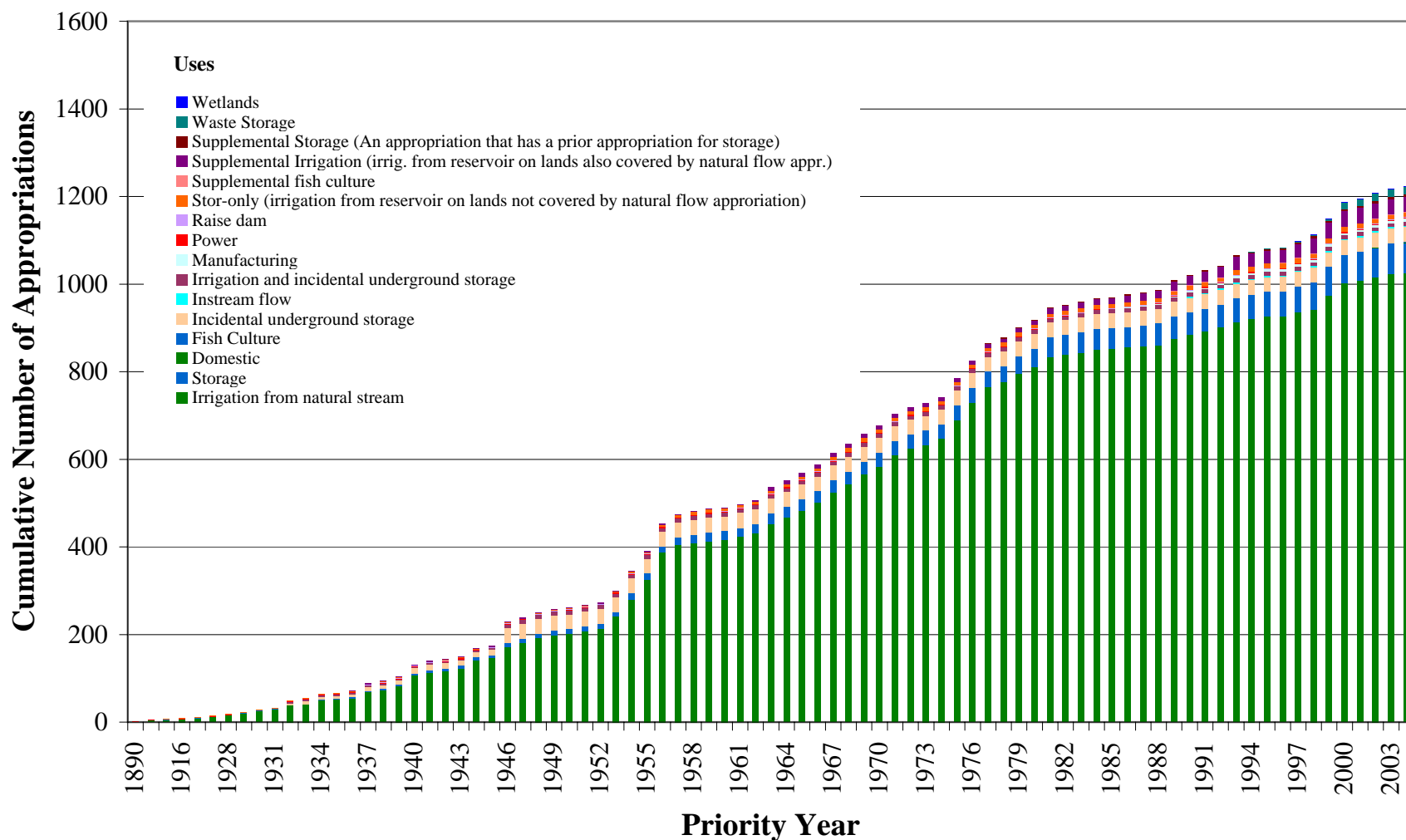


Figure L-57

Cumulative Surface Water Appropriated Acres in Loup River Basin

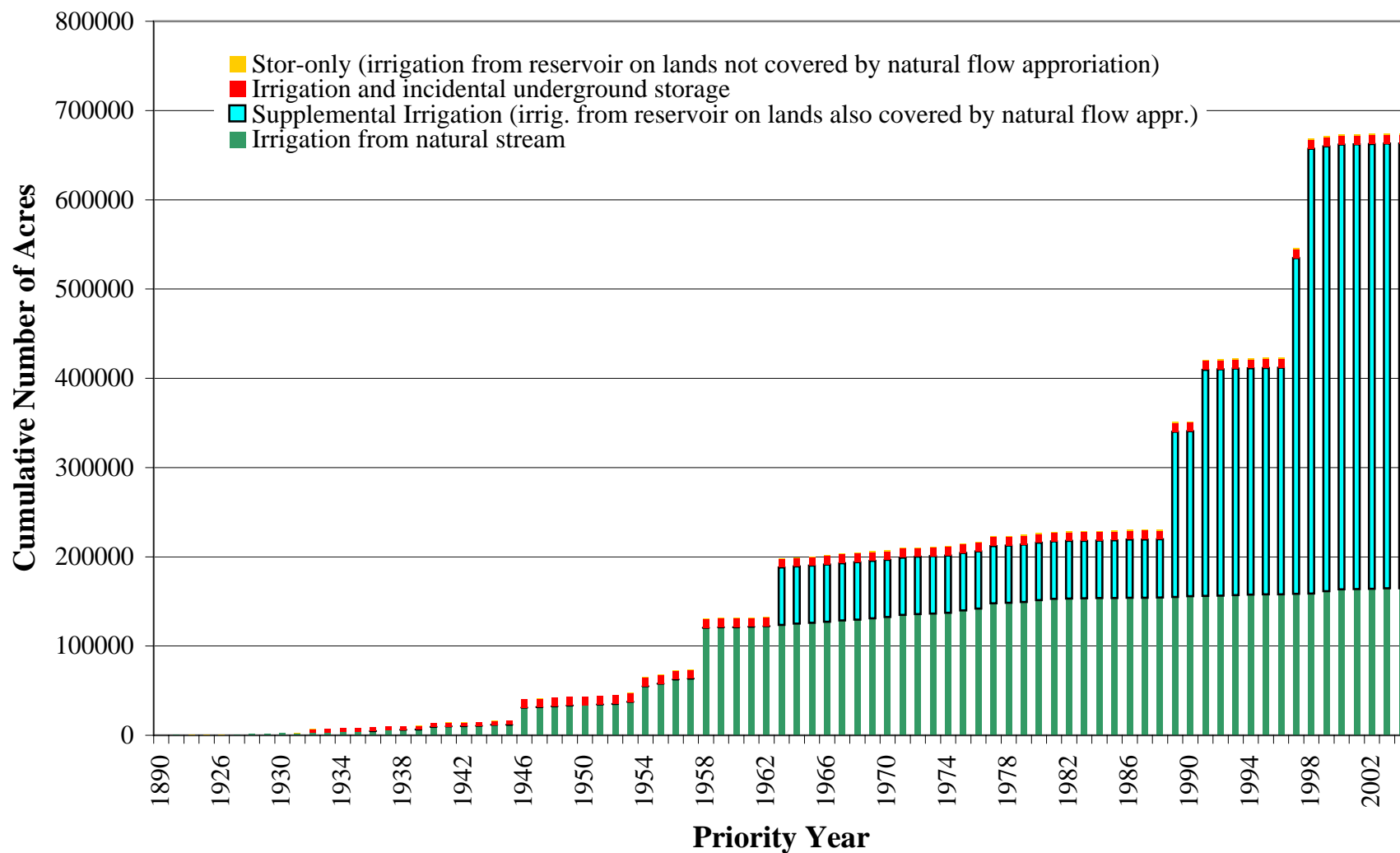


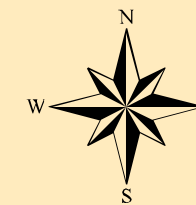
Figure L-58



Planning and Assistance Division

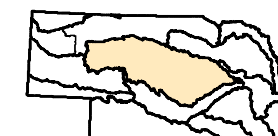
Surface Water Points of Diversion

LOUP RIVER BASIN



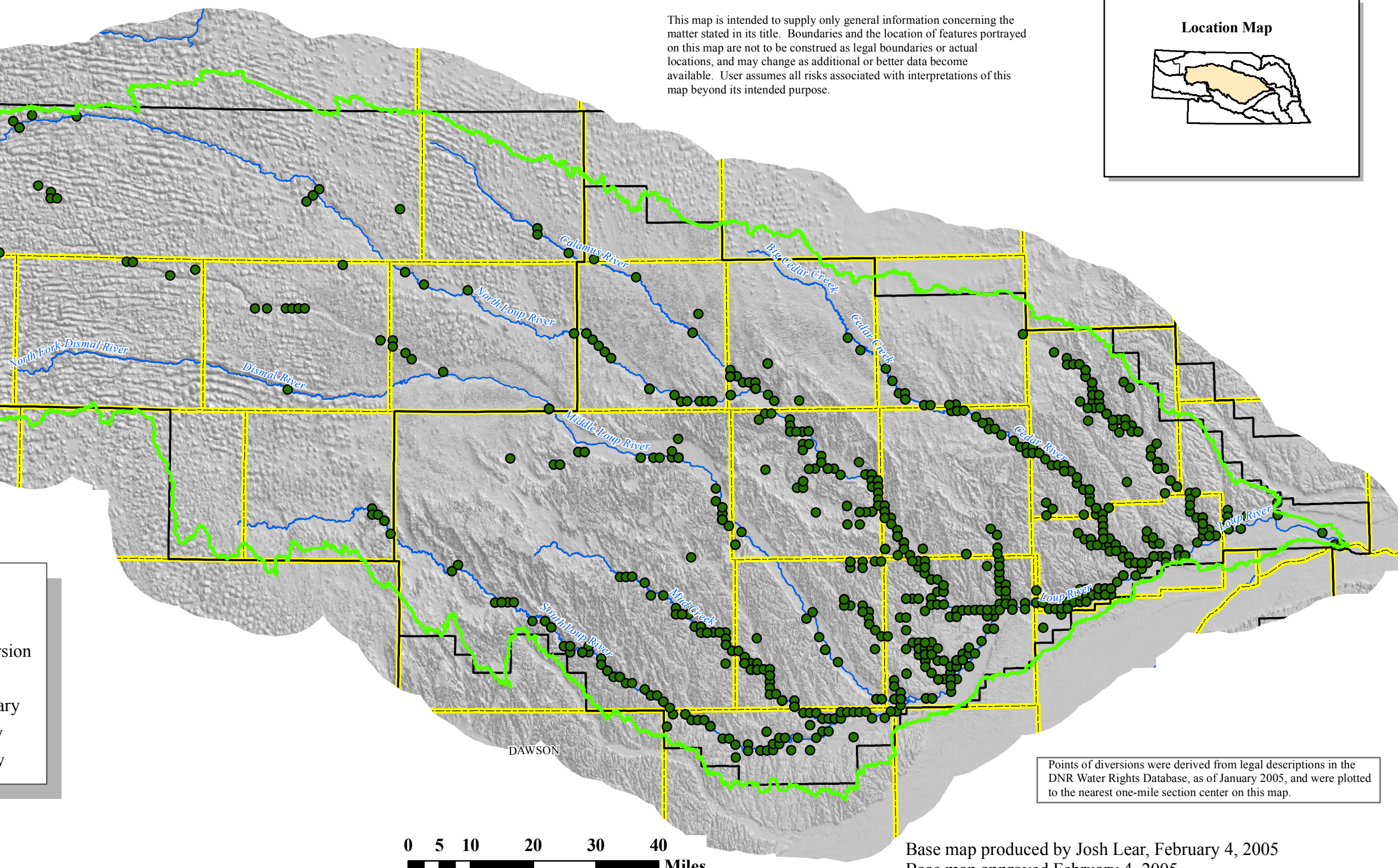
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Location Map



Explanation

- Loup Basin
- Points of Diversion
- Cultural Features**
- County Boundary
- State Boundary
- NRD Boundary



Points of diversions were derived from legal descriptions in the DNR Water Rights Database, as of January 2005, and were plotted to the nearest one-mile section center on this map.

Figure L-59.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Points of diversion map produced by Shuhai Zheng, October 11, 2005.

Figure L-60. Annual Diversions, Burwell-Sumter Canal.

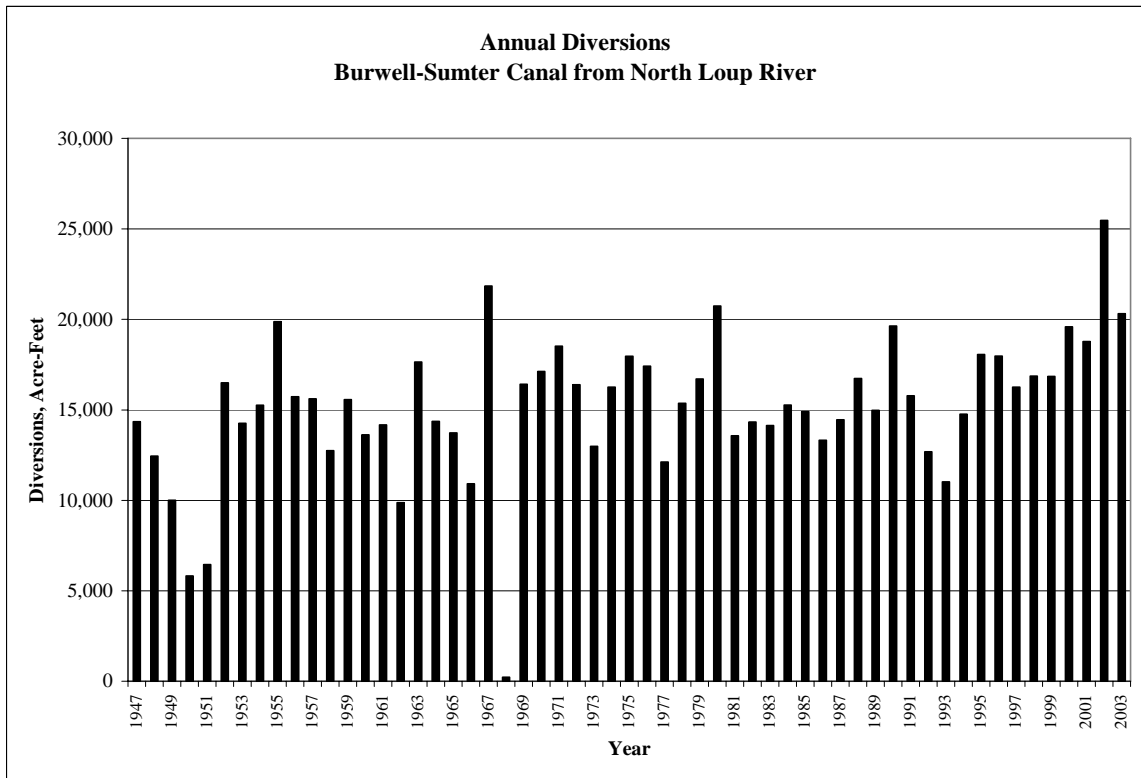


Figure L-61. Annual Diversions, Farwell Main Canal.

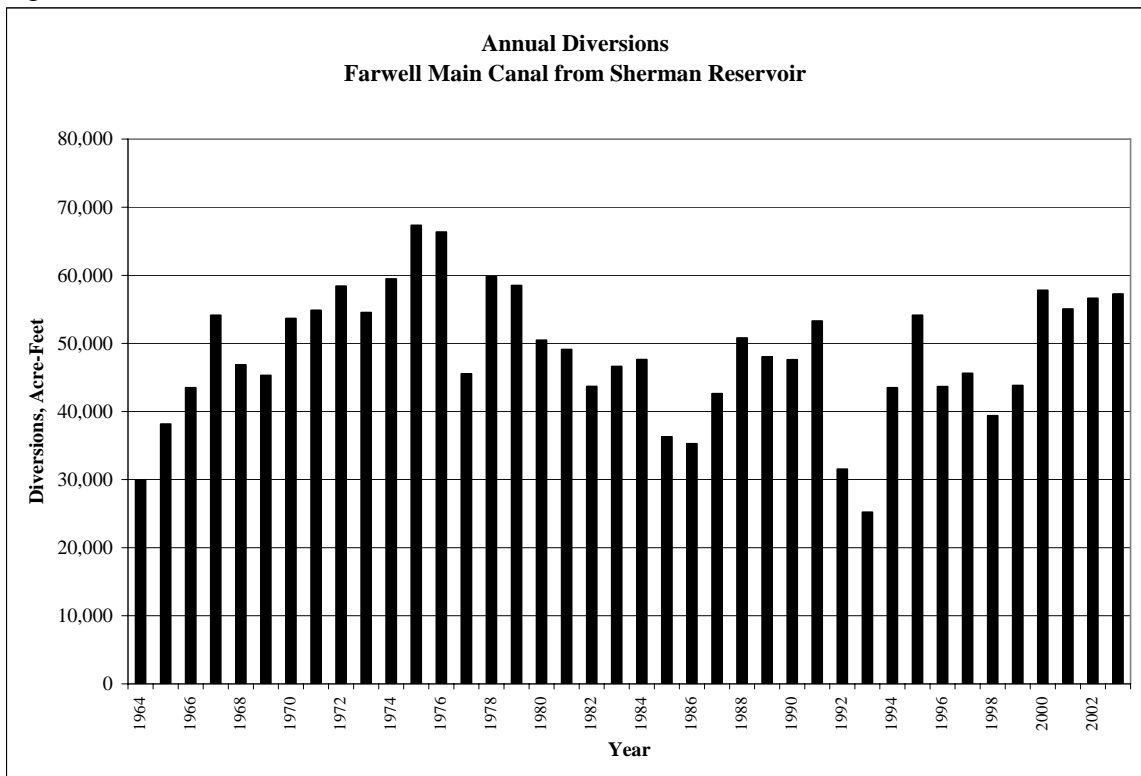


Figure L-62. Annual Diversions, Farwell South Canal.

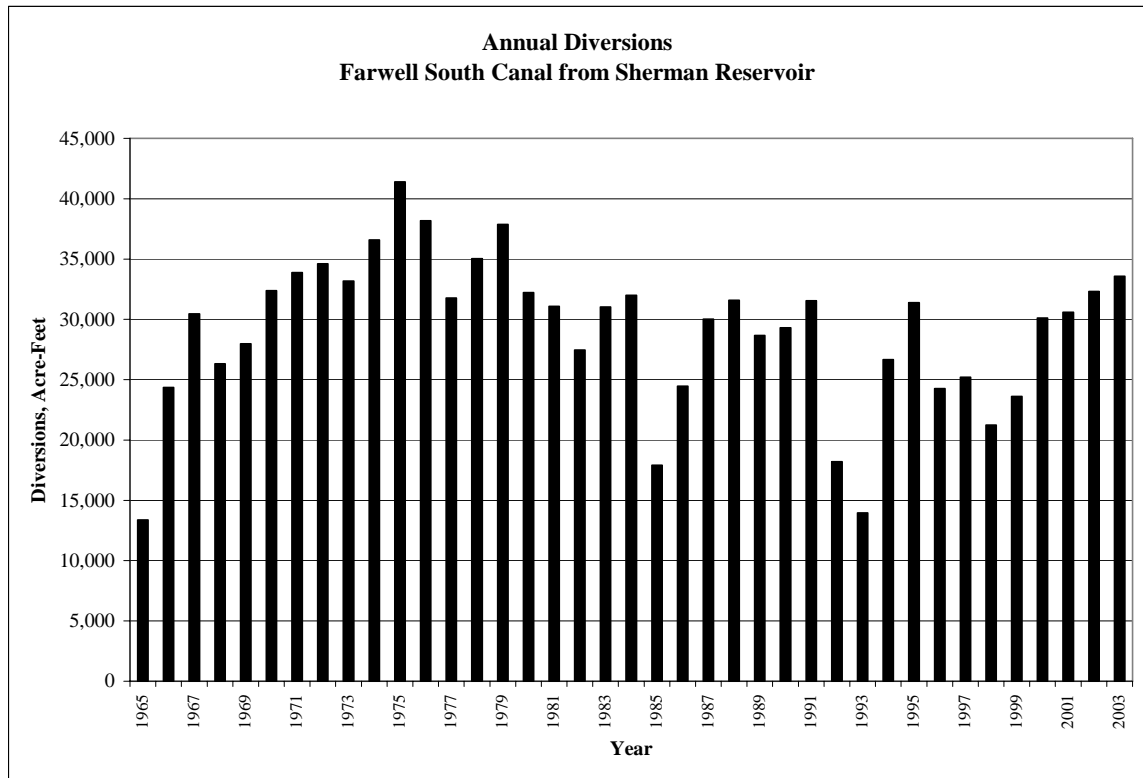


Figure L-63. Annual Diversions, Middle Loup Canal No. 1.

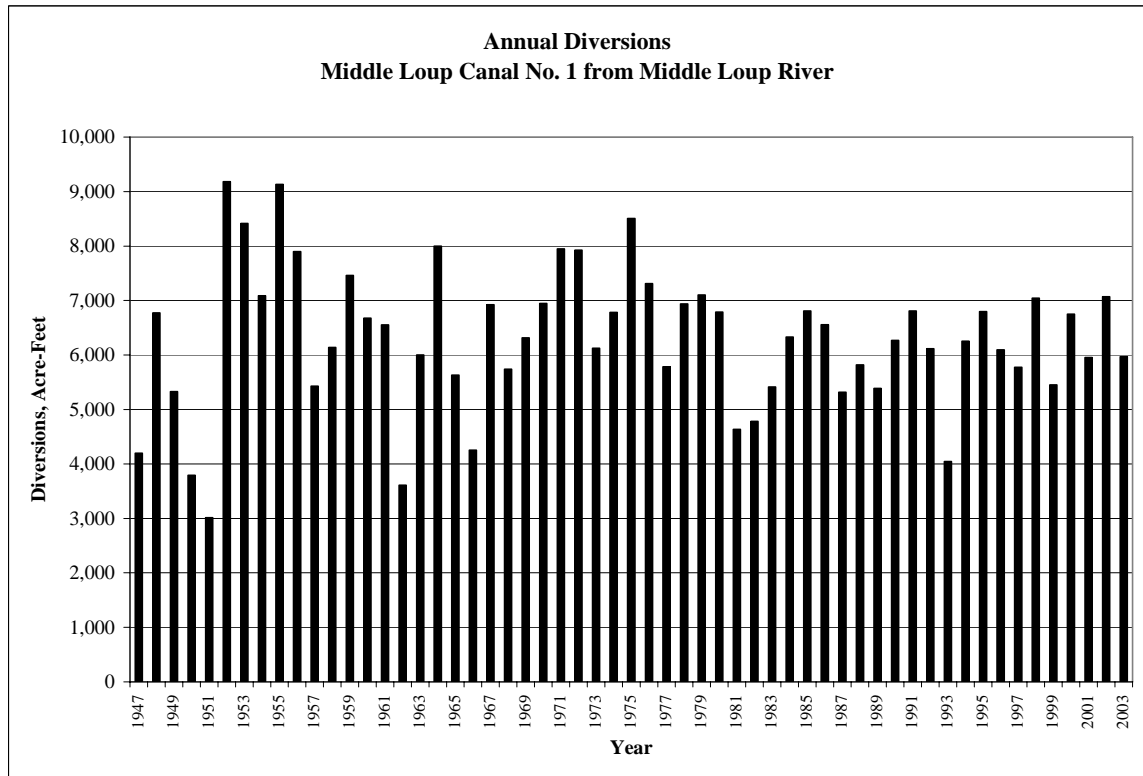


Figure L-64. Annual Diversions, Middle Loup Canal No. 2.

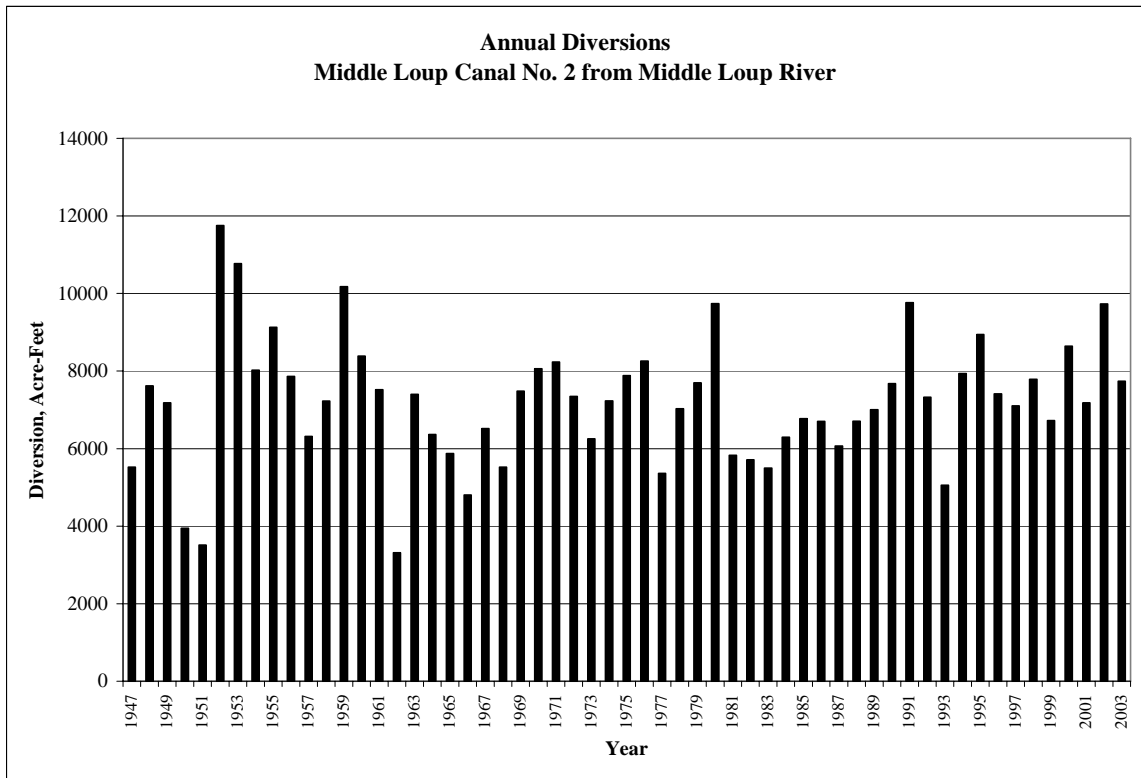


Figure L-65. Annual Diversions, Middle Loup Canal No. 3.

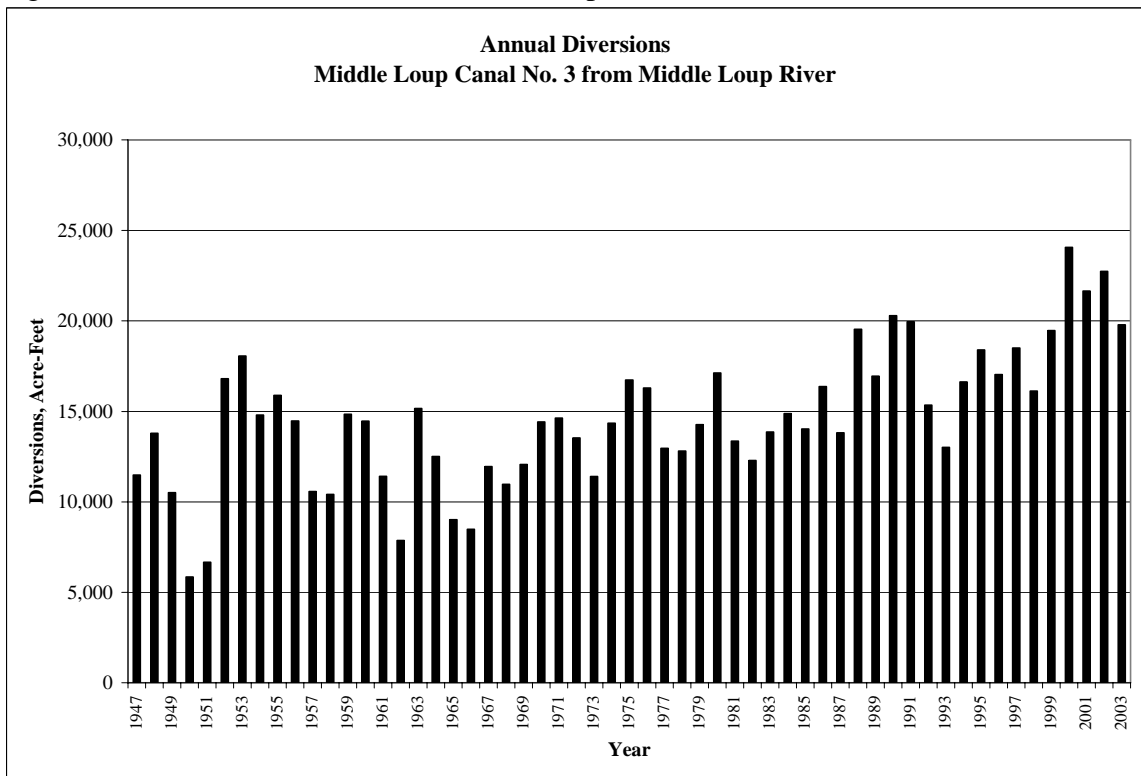


Figure L-66. Annual Diversions, Middle Loup Canal No. 4.

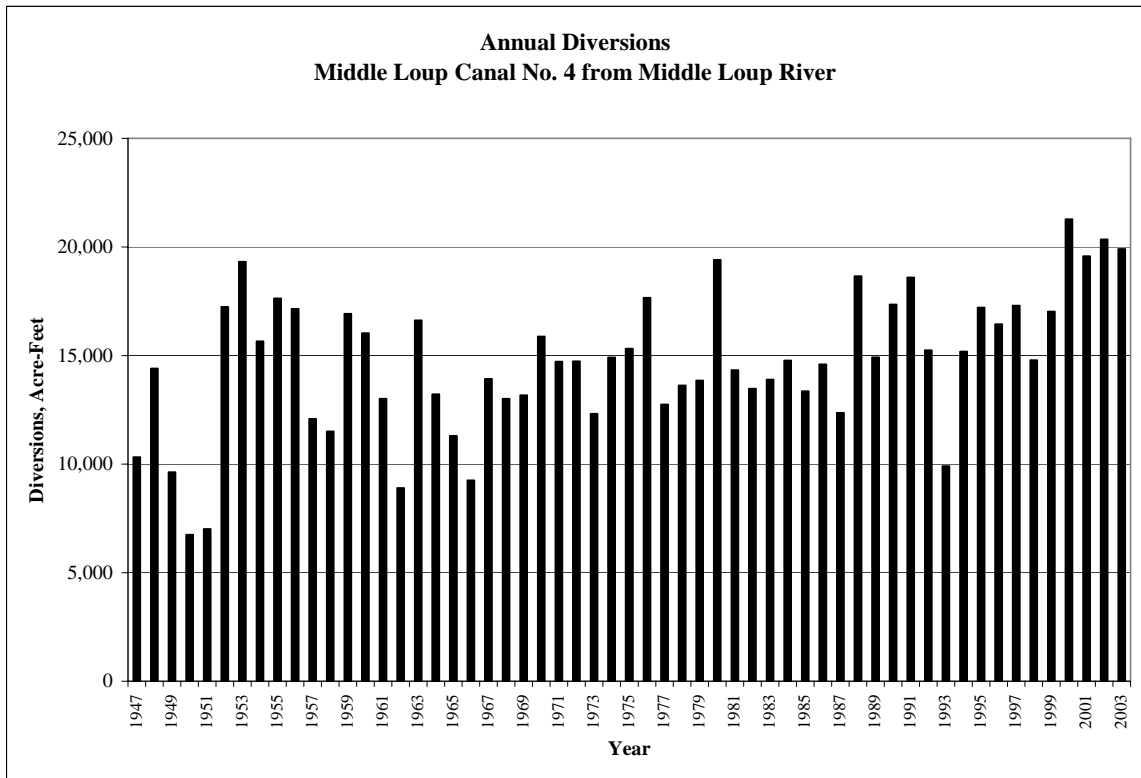


Figure L-67. Annual Diversions, Mirdan Canal.

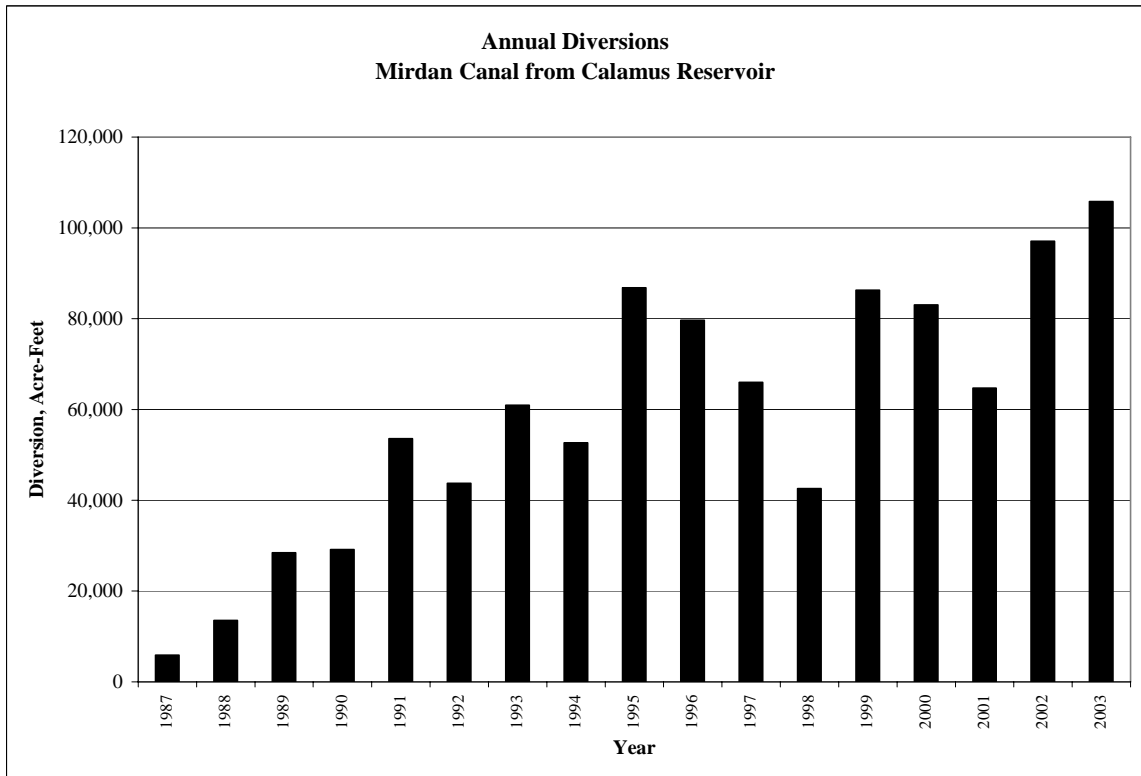


Figure L-68. Annual Diversions, Ord-North Loup Canal.

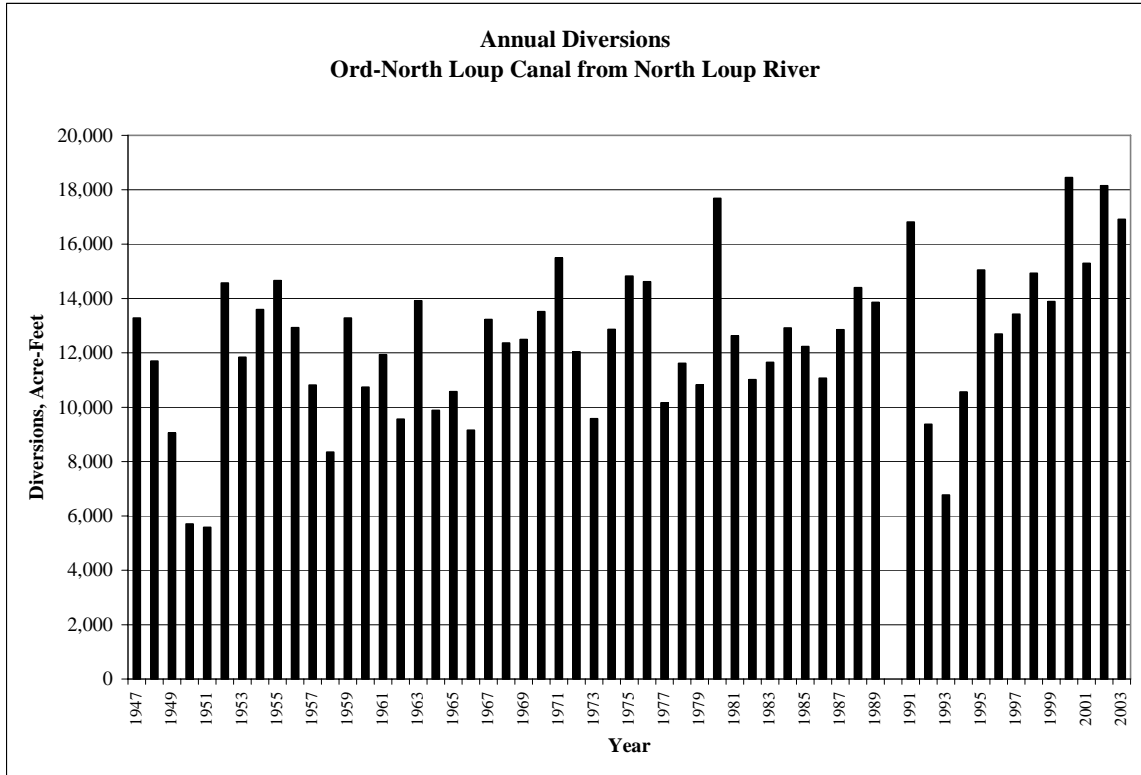


Figure L-69. Annual Diversions, Sargent Canal.

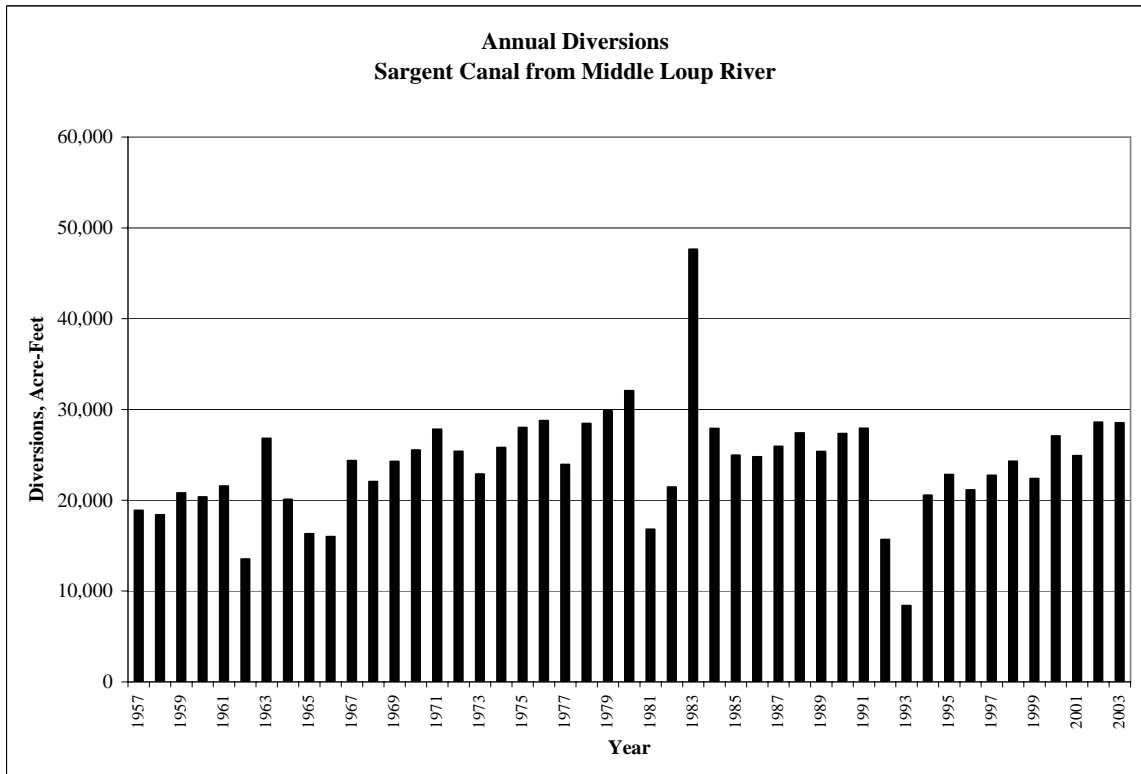


Figure L-70. Annual Diversions, Taylor-Ord Canal.

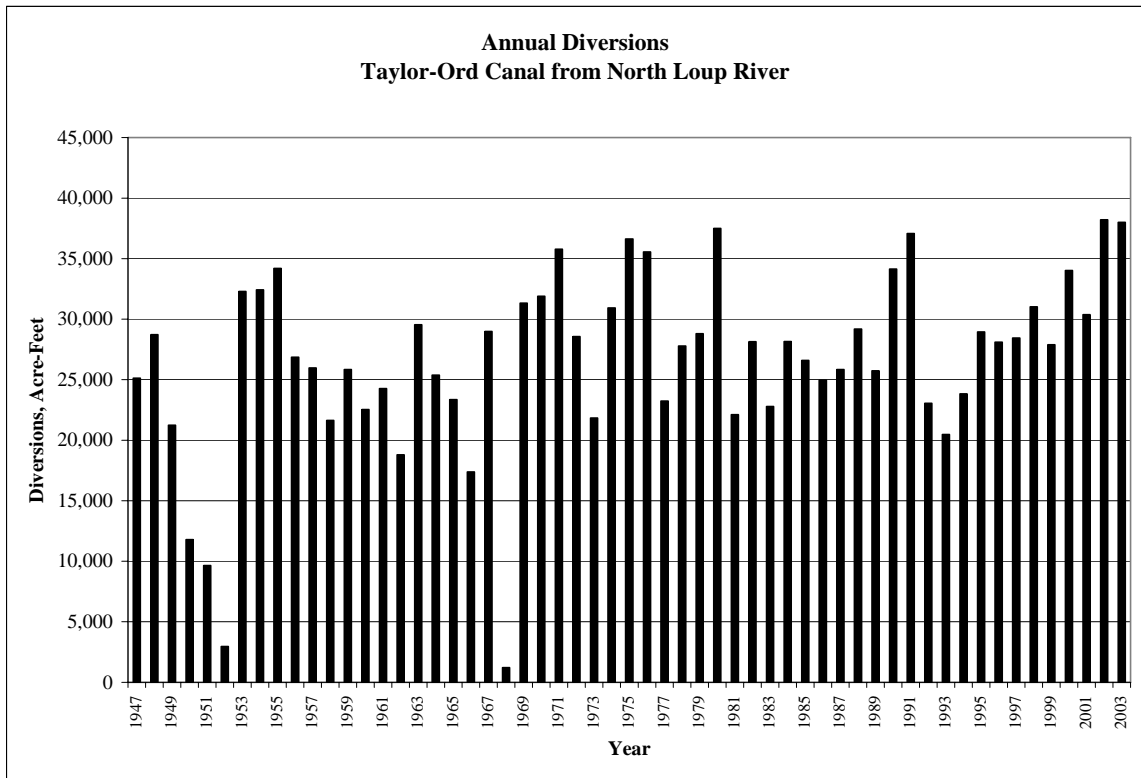
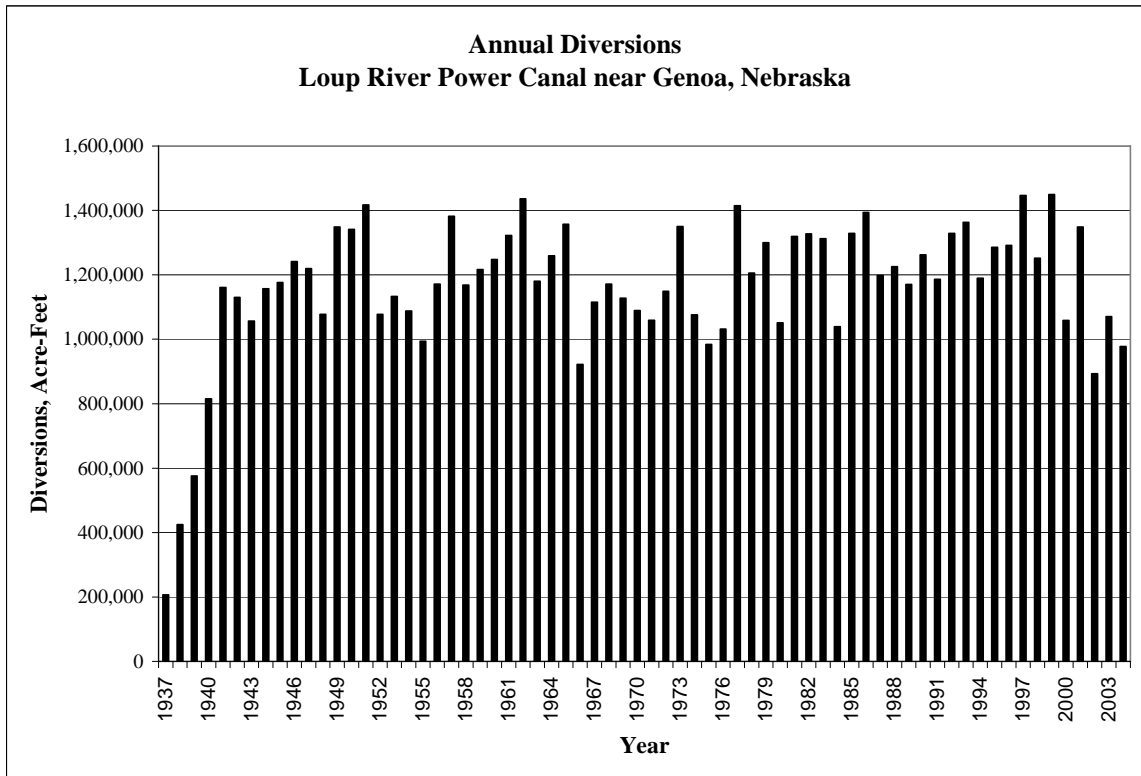


Figure L-71. Annual Diversions, Loup Power Canal.

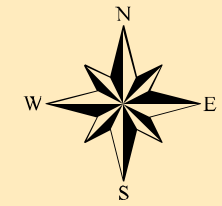




Planning and Assistance Division

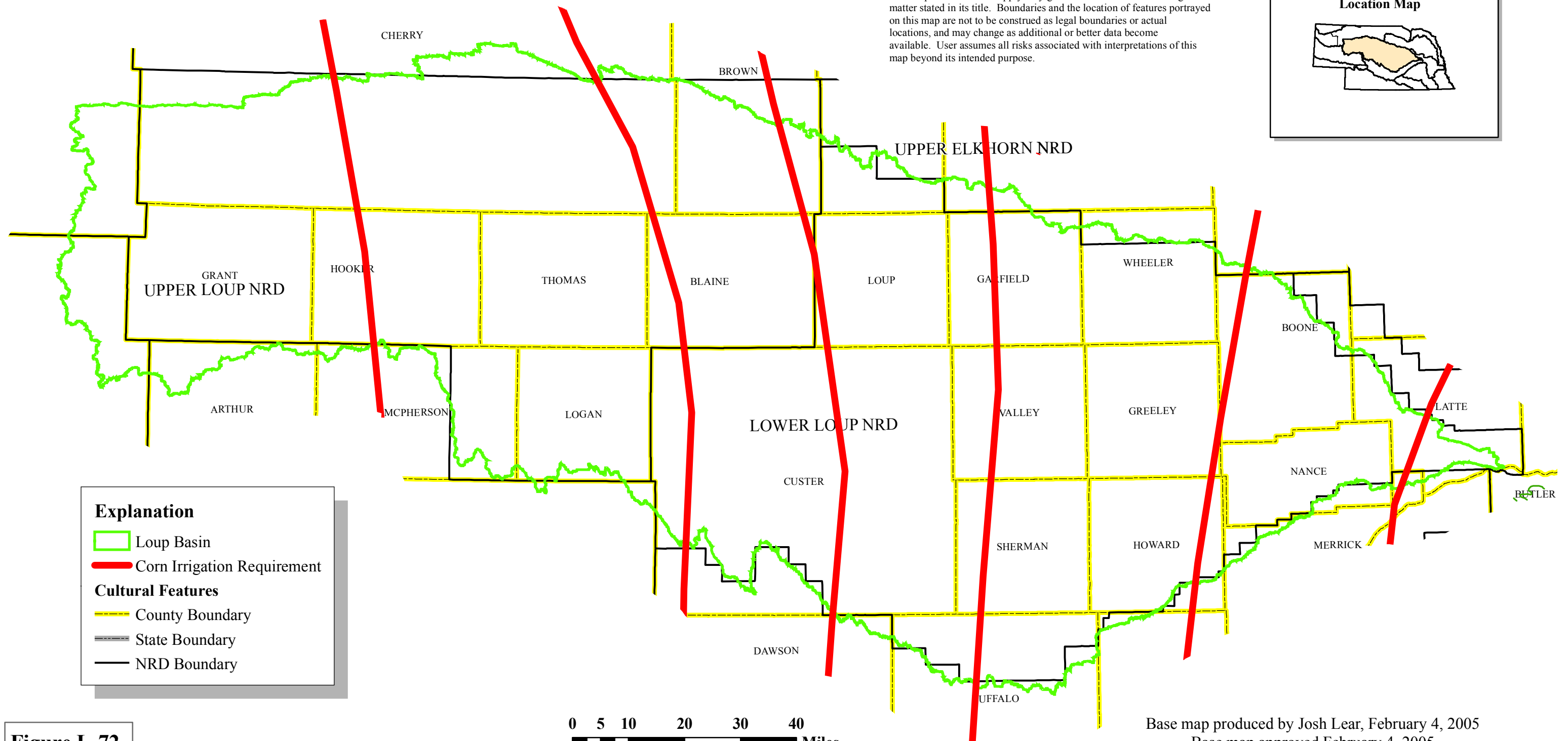
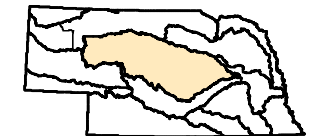
Corn Irrigation Requirements

LOUP RIVER BASIN



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Location Map



Explanation

- Loup Basin
- Corn Irrigation Requirement

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

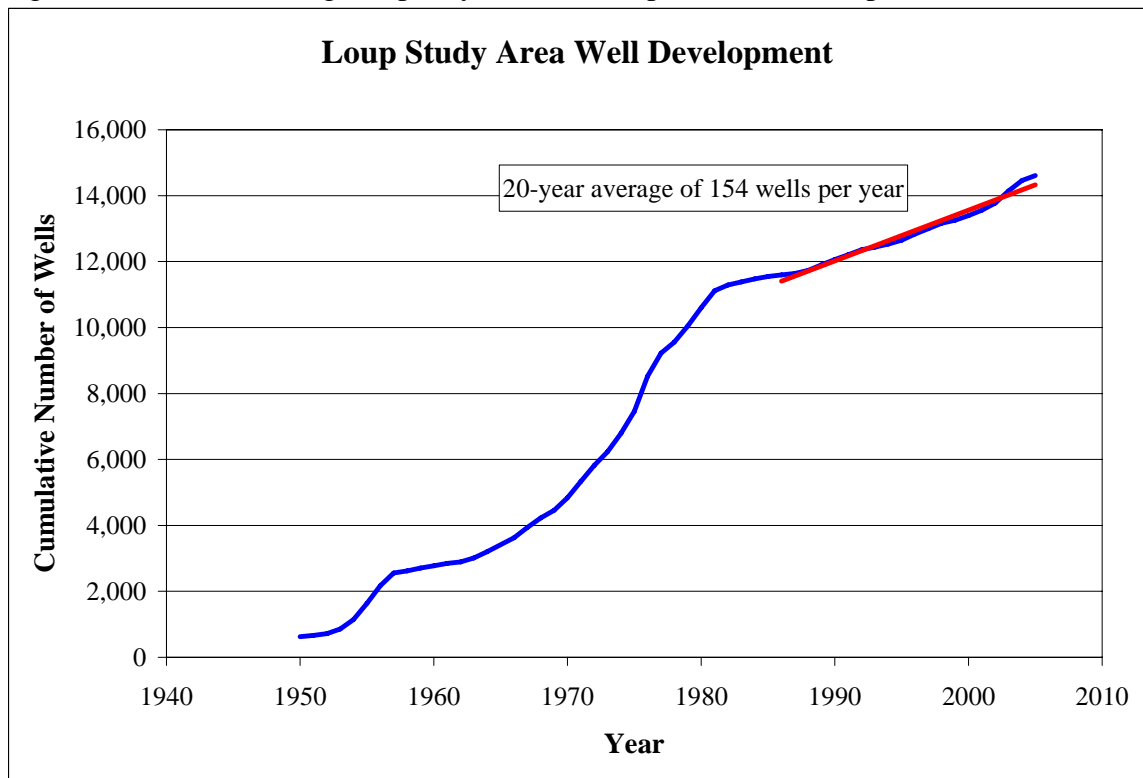
Figure L-72.

Base map produced by Josh Lear, February 4, 2005

Base map approved February 4, 2005

Transmissivity map produced by Kevin J. Schwartzman, December 7, 2005

Figure L-73. Historic High Capacity Well Development in the Loup Basin Model Area.



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Citation Bentall, R.& Hamer, T., 1980, Stream-Aquifer Relationships in Nebraska: UNL Conservation and Survey Division and Nebraska Department of Water Resources, 102 pages, 171 illustrations.

Citation Boohar, J.A., and Provaznik, Mary Kay, 1996, Peak flows for the period of record for current and discontinued streamflow stations in Nebraska: U.S. Geological Survey Open-File Report 96-101, 518 p.

Citation Brice, J.C., 1964, Channel Patterns and Terraces of the Loup Rivers in Nebraska, Physiographic and Hydraulic Studies of Rivers: U.S. Geological Survey Professional Paper 422-D, 41 pages.

Citation Brown, D.W., 1955, Ground-water resources of the Middle Loup division of the lower Platte River basin, Nebraska: U.S. Geological Survey Water-Supply Paper 1258, 85 p.

Citation Busby, J.C., 1950, Sedimentation characteristics of recent sands of the Middle Loup and Dismal Rivers, Thesis (M.S.)--University of Nebraska (Lincoln campus)-1950.

Citation Carlson, M.P., 1993, Geology, Geologic Time and Nebraska: Conservation and Survey Division Educational Circular No. 10, August 1993, 60 pages.

Citation Channel, C.B., 1901, Third Biennial Report of the State Engineer, Secretary of the State Board of Irrigaion to the Governor of Nebraska 1899 and 1900: Hunter Woodruff Printing Co. Lincoln, Nebraska, 220 pages.

Citation Chen, H.H. and Druliner, A.D., 1987, Nonpoint-source agricultural chemicals in ground water in Nebraska—Preliminary results for six areas of the High Plains aquifer: U.S. Geological Survey Water-Resources Investigations Report 86-4338, 68 p.

Citation Chen, X.H., and Chen, X., 2004, Simulating the Effects of Reduced Precipitation on Ground Water and Streamflow in the Nebraska Sand Hills, Journal of the American Water Resources Association (JAWRA) 40(2):419-430.

Citation Church, L.C., 1996, Water budget analysis with chemical mass balance implications for shallow lakes in the western lakes region of the Nebraska Sand Hills, Thesis (M.S.)--University of Nebraska--Lincoln, 1996.

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Citation Donofrio, C.J., 1982, Bedforms of the North Loup River, Nebraska : a braided stream, Thesis (M.S.)--University of Nebraska--Lincoln, 1982.

Citation Drda, S., 1998, Hydrology of two interdunal valleys in the Nebraska Sand Hills, Thesis (M.S.)--University of Nebraska--Lincoln, 1998.

-
- Citation Druliner, A.D., Chen, H.H., and McGrath, T.S., 1996, Relations of nonpoint-source nitrate and atrazine concentrations in the High Plains aquifer to selected explanatory variables in six Nebraska study areas: U.S. Geological Survey Water-Resources Investigations Report 954202, 51 p.
-
- Citation Druliner, A.D., Chen, A.H., and Hull, S.H., 1997, The chemical quality of overbank sediment deposited by the 1993 floods and streambed sediment in major streams at selected sites in eastern Nebraska: U.S. Geological Survey Open-File Report 96-419, 57 p.
-
- Citation Dugan, J. T., 1984, Hydrologic characteristics of Nebraska soils: U.S. Geological Survey Water-Supply Paper 2222, 19 p., 12 pls.
-
- Citation Dugan, J.T., and Zelt, R.B., 2000, Simulation and analysis of soil-water conditions in the Great Plains and adjacent areas, central United States, 1951-80: U.S. Geological Survey Water-Supply Paper 2427, 81 p.
-
- Citation Ehrman, R.L., 1987, Origin of "dissipation" structures, Nebraska Sand Hills, Thesis (M.S.)--University of Nebraska--Lincoln, 1987.
-
- Citation Ellis, M.J., and Hiergesell, R.A., 1985, Evaluation of surface geophysical methods for collection of hydrogeologic data in the Nebraska Sand Hills region: U.S. Geological Survey Water-Resources Investigations Report 85-4195, 56 p.
-
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